

# BUTANE-PROPANE

## News

25¢



We're not building any ranges these days . . . we're helping America build a victory. But we haven't stopped *thinking* about ranges. And from that thinking and planning a new Grand Gas Range is growing . . . a range that will offer the American housewife an undreamed-of degree of convenience and efficiency. It may or may not resemble the "dream range" illustrated above, but whatever its final form, the post-war Grand will be fully worthy of its name . . . *first* in its field.

*When Peace Comes,  
It Will Be GRAND*

RANGES • CLEVELAND, OHIO Division of the Cleveland Co-Operative Store Co.

SEPTEMBER 1942



## HACKNEY CONSTRUCTION ASSURES LONGER LIFE

Hackney Cylinders have been engineered to meet the requirements in the transportation of L-P Gas from producer or distributor to user. Time-tested dependability and satisfactory performance are provided.

Hackney Special Cold Drawing Process assures uniform sidewall thickness and further is a test of the quality of the steel itself. Only a single circumferential body weld, X-ray controlled, is found in the design and construction of Hackney L-P Gas Cylinders. Continuous trouble-free service is assured by heat-treatment of the finished product. Long life is built into Hackney cylinders.

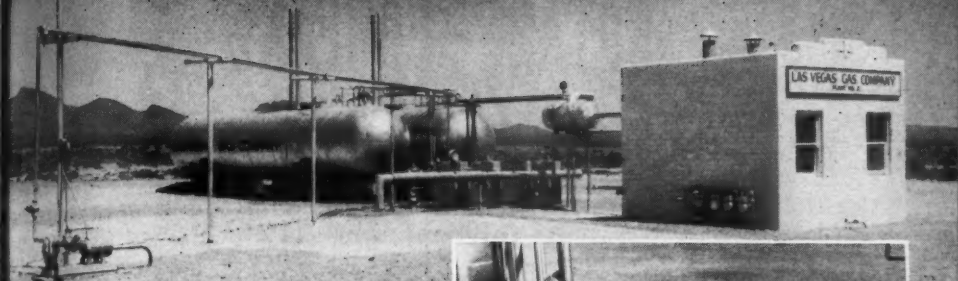
These and many other advantages have served L-P Gas producers and users for years and have won widespread preference for Hackney cylinders. They are the result of years of experience in working with all types of metals, a competent use of modern manufacturing equipment and facilities, extensive research and an intimate knowledge of the user's requirements and the conditions under which Hackney cylinders would be used. Today, while there are restrictions on metals, there are no priorities on knowledge, skill, imagination and Hackney interest in product improvement. These are continuing. These are your assurance of the continued superiority of Hackney cylinders.

# PRESSED STEEL TANK COMPANY

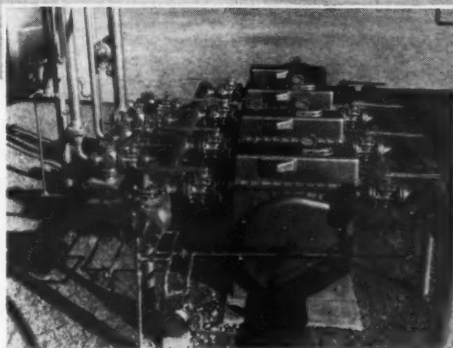
General Offices and Plant: 1487 So. 66th St., Milwaukee, Wisconsin

*Containers for Gases, Liquids and Solids*

# Fuel on the Desert



*Accurately Measured*  
**WITH EMCO NO. 5  
 PRESSED STEEL BUTANE METERS**  
*Positively Controlled*  
**BY NORDSTROM  
 LUBRICATED PLUG VALVES**



Compact Battery of EMCO Pressed Steel Meters Measuring Butane at Las Vegas Plant. All Lines are Nordstrom Valve Controlled.

THE fuel requirements for suddenly increased consumer demands, such as experienced by the Las Vegas Gas Company, can best be handled with a flexible, quickly erected Butane central plant and distribution system. For well over a year now this remote desert "fuel bin" has been aiding the war effort. Facilities permit a sendout of over 100,000,000 B. T. U. per hour for the peak requirements of an essential service.

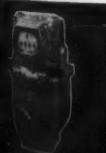
EMCO No. 5 Pressed Steel Large Capacity Butane Meters were selected for the all-important job of measuring this output. Their compact dimensions make possible an instal-

lation of the utmost efficiency. Their comparatively light weight is an asset in handling both during transportation and in piping operations. These meters are proving their stamina and worth under climatic conditions such as only the desert can produce.

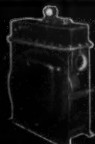
Also specified for the lines in this plant were Nordstrom Lubricated Plug Valves. Their inbuilt leak resistance on difficult Butane services has been thoroughly proven. Here, as in thousands of other Butane-Propane valving operations, Nordstrom Valves were chosen to provide absolute safety and easy positive operation.

## PITTSBURGH EQUITABLE METER COMPANY

NEW YORK OAKLAND MERCER NORDSTROM VALVE COMPANY KANSAS CITY SEATTLE  
 BROOKLYN TULSA Main Offices, Pittsburgh, Pa. PHILADELPHIA HOUSTON  
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 MEMPHIS LOS ANGELES BUFFALO



Butane Propane Liquid Meter



EMCO Large Capacity Pressed Steel Gas Meter



EMCO Type "B" Ejector Service Regulator



ROTOCYCLE Meter for Liquid Butane-Propane



NORDSTROM Lubricated Plug Valve



# BUTANE-PROPANE

## News

Reg. U. S. Pat. Off.



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# MISSIONARIES OF "MEASURED HEAT"



• Many valuable facts are being offered these days on the vitamin content of foods. But have you noticed how little the public is told about how to cook these foods so that these vitamins may be preserved?

• Robertshaw has seized this golden opportunity to perform a much-needed public service—and also promote the modernity of gas cooking so that there will be a market for better gas cooking equipment when peace is here again.

• Through its Education Program, Robertshaw is teaching the gospel of "Measured Heat"

and the part heat plays in proper cooking. The Robertshaw "Measured Heat" Program is used by Home Economics teachers in grade and high schools. It is also widely used by County Home Demonstration Agents, Home Economics supervisors, and at Universities where home economics teachers study. These are the people in whose hands the future of gas cooking lies.



**ROBERTSHAW THERMOSTAT COMPANY**  
YOUNGWOOD, PA.

**THE ROBERTSHAW  
MEASURED HEAT PROGRAM**  
explains the importance  
of optimum temperature  
in baking and roasting—

It covers in detail batters and doughs, the functions of the ingredients, leavening agents and measured heat...

It shows comparative results in pictures on wall charts, in student material and text books.

SEPTEMBER-1942

# LETTERS

Gentlemen:

The War Production Board has seen fit to grant gas company utilities an A-1-c priority for maintenance and repair, under restricted conditions, so that safe operation may be continued and interruptions in service prevented.

Our own company has between 30,000 and 40,000 cylinders in service. Each month we must replace approximately 50 stainless steel stems and lead packing in the tank valves. The A-10 rating which has been given the LP-Gas industry for maintenance and repair of its equipment is not sufficiently high to purchase these essential materials since "priority inflation" has set in.

The only alternative left us if we are to keep our equipment in safe and satisfactory operation is to fill out the PD-25-A form which is primarily designed for manufacturers. This form is very long—we have been told by one firm using it that it required the addition of two more bookkeepers. It is only applicable where the manufacturer has purchased \$5,000 worth of the required metal in the previous year's quarter. It only allots a three month's supply whereas those who manufacture valves and valve parts will not begin production on so small an order.

If this is a problem common to LP-Gas operators, and we believe it is, then we would urge that the Liquefied Petroleum Gas Association petition the War Production Board for relief similar to that which has been given the gas utility companies, namely an A-1-c rating under priority order P-100, for certain necessary and

essential purposes which may be determined by the Board and the Industry.

R. G. Hardie  
Secretary, Imperial Gas Co.  
Los Angeles, California.

Gentlemen:

Here is a list of hospitals that are using LP-Gas. Possibly your Nevada subscriber who seeks data on hospital operation could secure the desired information from one of these, all of which are in California: Wish-I-Ah hospital, Auberry; Clovis sanitarium, Clovis; Ahwanee hospital, Oakhurst. Rural Butane Service, Fresno, California.

Gentlemen:

I have been awarded the State sanitorium butane contract to furnish butane gas at Mount Vernon, Mo. There are two 1100-gal. tanks and one 2500-gal. tank.

Butane has been used at this hospital for a number of years for cooking. Heavy duty Magic Chef ranges are installed.

A. E. Elkins  
Elkins Butane Gas Company,  
Wheaton, Missouri.

Gentlemen:

Last month one of your subscribers asked for information on the use of LP-Gas in hospitals. We enclose a copy of a letter from the Newfoundland (New Jersey) Health Association, a tubercular sanitarium using propane for cooking. The costs are based on propane at \$8.40 per 100 lbs. Here is the letter:

BUTANE-PROPANE News

"I have your inquiry as to the cost of gas per meal. During May our cost was approximately  $\frac{3}{4}$  cent per meal (.737 cent to be exact). A recent six month average figure was .85 cents. We attribute this recent drop in the cost of gas to the fact that we now have a new cook who is more careful to turn the gas off when it is not in use.

"F. A. F. Hoagan,  
"Managing Director."

I hope this information will be helpful.

Edward Braen.  
President, Propane Gas Service,  
Hawthorne, New Jersey.

Thank you for the letters and your trouble. The information will be passed along. Who knows of other hospital records?—Ed.

Gentlemen:

Is form PD-397 (form for exception under L-79) kept on file, or must WPB grant permission before installation is made?

K. B.

Illinois

In reply to your recent inquiry to our Research Department regarding exceptions to Limitation Order No. L-79, we can inform you that, according to the local office of the War Production Board, you would not have to obtain special permission from the War Production Board to make installations that are permissible under L-79. You would have to obtain letters from your prospective clients as indicated by the tear sheets which I am enclosing relative to L-79 from the June issue of BUTANE-PROPANE News.

There is no form for exceptions to L-79. Form PD-397 is the form for exceptions to Limitation Order L-86.—Ed.

Gentlemen:

Enclosed is check for \$5.00 for which please send one copy of the third edition of the Handbook BUTANE-PROPANE Gases.

After more than seven years in the butane business, I find the Handbook the most helpful and authentic source of information that we have been able to find.

J. H. Winton

Beaumont, Texas

Gentlemen:

We have had an order for butane scaling torches and, to date, have not been able to find such a torch.

In explanation, would say the scaling torch is similar to a torch for welding except that there are several heating flames from a block of approximate dimensions of 1 in. x 2 in. x  $\frac{1}{4}$  in., with the flames coming from the edge. This torch is used to heat the scale on metal and loosen it at the same time the torch is pushed along the metal surface, thus scraping the scale completely loose from the surface.

No doubt a specially designed torch head, or tip, would be necessary where butane is used instead of acetylene.

If possible, we would like to have our requirements, as noted, passed along to a supplier.

D. S.

Oregon

While we have not heard of this application of LP-Gas in any given instance, we have no doubt but what it would be feasible.

Your need is being called to the attention of advertisers in BUTANE-PROPANE News who make special burners.—Ed.

Gentlemen:

Our check to renew our subscription to BUTANE-PROPANE News is enclosed. We greatly appreciate the up-to-date and helpful character of the magazine no less than the cordial and helpful response of its staff to the needs of the LP-Gas industry.

L. R. Lackey

Blythe Gas Company, Ltd.  
Blythe, California

• BUTANE-PROPANE News welcomes letters from our readers, but it must be understood that this magazine does not necessarily concur in opinions expressed.—Editor.



**CHAS. O. RUSSELL**  
**Guest Editor for September**

# Mark Time—March!

By CHAS. O. RUSSELL

President, Thermogas Co., Inc., Des Moines, Iowa

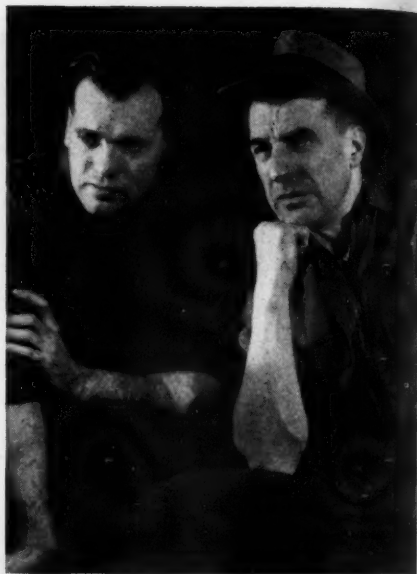
**W**E are all familiar with the above order of our armed forces, and have witnessed a company of soldiers execute this order. Each man executes the order simultaneously and the company holds its formation and keeps on marking time until the next order is given. This is what we expect from a well trained group of soldiers. Their ability to obey orders determines the effectiveness of the company in the successful prosecution of war.

We, of the liquefied petroleum gas industry are a part of the defense forces of the United States and the effectiveness of our aid to the war effort is directly proportionate to the manner in which we obey the orders given to us by the War Production Board. General Limitation Order No. L-86 is our order to **MARK TIME—MARCH!** This order has been given by the commanding officer, and everyone in the industry is a part of the formation, irrespective of rank, and the appearance of our group is dependent upon the proper execution of this movement by everyone at the same time. Industry loyalty, as well as individual pride and patriotism, should prompt us to make as good a showing as possible at all times. Certainly an inspecting officer watching the formation will be able to detect the good soldiers and the poor ones.

Everyone in the industry should carefully analyze his own activities in connection with the orders given, and execute them to the very best of his ability. It is up to us individually and collectively to make Company L.P.G. one of the best in the whole United States war effort. The organization, ability, cooperation and effort of such industries as our own will play a very important role in the expeditious prosecution of this war.

Our challenge is to be good soldiers—we shall meet that challenge.

# Twice the work with BUTANE



If you use heat in your operations, whether in a furnace, dryer, kettle, or at the end of a torch, you can often speed up your production by using butane—the faster, hotter, cleaner fuel.

We manufacture a complete line of burners and torches for industrial applications. They operate on butane, propane, natural and manufactured gases. Tell us your needs and we will try to supply the right answer.

## RANSOME COMPANY

*Designing and Constructing Engineers*

4030 HOLLIS STREET • EMERYVILLE, CALIFORNIA

*Ransome*



# MAINLY BEYOND THE MAINS

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## The Month

Currently the national picture as respects the marketing of LP-Gas is little changed during the past month. The supplies of both butane and propane are plentiful, and transportation facilities are still able to handle the necessary movement from producer to ultimate distributor. Some misgiving is felt regarding the ability of existing tank cars and long haul trucks to care for the demand that the coming winter will create, but if every available storage container is kept full at all times when it is possible to obtain deliveries, there is a good possibility that serious shortages of fuel may be averted.

During the past three weeks, however, the critical materials situation has become much worse, and the dribbles of steel that were still being released for the manufacture of cylinders have been reduced to practically nothing at all. There are grounds for expecting that this situation will not improve, but rather that it will become worse for many months to come. In his own interest, it behooves every dealer and distributor to hang onto the inventory that he now has, except for any items of equipment that may be far in excess of his normal require-

ments for service maintenance and repair.

The LP-Gas section of WPB moves slowly and none too surely in the direction of its long projected industry inventory. A questionnaire has been devised, but will probably not be released until late in September with the result that a year will probably have passed since Pearl Harbor before the returns are all in and the results tabulated. The impression one gains around WPB offices is that as far as LP-Gas is concerned, the department is bogged down with PD-397 forms, applications for exception to the General Limitation Order, L-86. The department would undoubtedly prefer to see a diminution of these applications; but inasmuch as many of them are being granted, there seems to be no reason why any dealer who feels that he has an application for service that can be shown to be "necessary and appropriate in the public interest and to promote the war effort" should not press for its determination with all of the arguments at his command.

Such an application, where granted, means an increase in the gas load, and is naturally attractive to the trade, but due regard for the necessity of maintaining service without ac-

cess to any new or replacement equipment at all, and for a long time to come, should always be uppermost. The dealer who comes out of the war with a smaller list of good customers who have been properly cared for will be in a much sounder position than one who has expended his load only to find that he was unable to properly service and maintain it.

### A Job Well Done

The return to private industry of J. Woodward Martin, of the Lone Star Gas Co., Dallas, Texas, after six months in the Office of the Petroleum Coordinator as LP-Gas analyst, marks the end of the shakedown cruise of the butane-propane industry in the service of a nation at war. No bureaucrat either by individual inclination or out of personal necessity, Martin joined the staff of the OPC at the request of the then assistant director of production, Paul Raigorodsky, after having been recommended for the post by the Directors of the Liquefied Petroleum Gas Association. The job completed which he had undertaken, he returns to his own company with the well earned appreciation of official Washington and of the entire industry to his credit.

Any attempt at a precise definition of the influence that Woodward Martin has had in bringing within the purview of government thinking a realistic understanding of the broad scope and essential nature of

LP-Gas would be an extremely difficult undertaking. It is only by looking at the before and after aspects of the situation that confronted him that we can in a measure evaluate the intangible accomplishments that were his.

At the time when the Association was asked to select a representative to work with the OPC, the picture was the darkest that it has been at any time since the start of the gradually accelerated defense program that was climaxed by war. Gloomy predictions were heard on all sides that the industry was headed for a curtailment of operations that would be fatal to thousands of dealers and distributors. The much ballyhooed synthetic rubber program and the expanding demands for high octane aviation gasoline were then destined to syphon off all of the available butane production at the source. The shortage of transportation facilities was destined to restrict the sale of propane to a few areas easily accessible from the refineries that produced it. A presumably responsible government official dismissed the problem of domestic consumption of both gases with the glib expression, "Luxuries must go. Let them cook with coal or wood." Ambassadors without credentials roamed the Capitol, each presuming to speak for the whole industry, and each bent on furthering the ends of his own self-interest. A limitation on LP-Gas was anticipated and many pessimistic

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bottled gas operators had come to regard it as inevitable.

As dark as the outlook may appear today, it is brighter in at least two respects than it was a little over six months ago. In the first place, there appears now to be no shortage in either gas or transportation that careful foresight on the part of dealers and distributors cannot cope with, and in the second place the industry as a whole is officially regarded as an important contributor to the war effort on the civilian front as well as in the manufacture of munitions and armaments.

It would be an exaggeration to assign the credit for this improved situation to any one man, and least of all would Woodward and Martin lay claim to that credit for himself. Yet it cannot be gainsaid that he injected the consideration of marketing problems into an atmosphere where only production was a matter of official concern; he transferred policy-making from that based on miscellaneous and conflicting opinions to the sure ground of ascertainable facts; he acted as indefatigable liaison between the OPC and the newly created LP-Gas Section organized within the WPB. Keenly sensitive to the magnitude of the crisis that confronts the nation, he has served both his country and his industry well. His labors, now successfully terminated, bespeak both the admiration and the appreciation of LP-Gas men everywhere.

## WPB DISCUSSES BUTANE

The following extracts are taken from a letter addressed to BUTANE-PROPANE News from Washington, D. C., under date of August 15, 1942:

"It is difficult for the War Production Board to make any definite statement because the conditions change over night.

"A good example of this is the demand for butane. A few months ago we felt that the demand for butane for the manufacture of high octane aviation gasoline and the needs for butane in our synthetic rubber program would produce a shortage of that product. At the moment it appears that, due to technological development in the manufacture of high grade aviation gasoline and due to revised and new methods of manufacturing synthetic rubber, this expected demand for butane will not develop.

"The thing that we are concerned about now is the transportation problem. If we can solve this problem . . . we do not anticipate any shortage of butane for either domestic or automotive uses.

"Perhaps we could sum this up into one paragraph by saying that the War Production Board is not going to be forced to restrict the use of butane as much as it had at one time felt would be necessary. If the War Production Board can continue to permit the use of butane in all present usages, that will be much better than we had expected to be able to do a few months ago. If we can be more liberal in expansion of uses than we have been, it will be solely because by so doing we are making best use of whatever fuels we have for the purpose of conducting this war to a successful conclusion.

"W. Walter Timmis, Chief

"Plumbing and Heating Branch

"By: John F. Steele, Chief,  
"Liquefied Petroleum Gas Section."

# No Shortage of Butane—

## Technical Developments in Manufacture of Synthetic Rubber and Aviation Gasoline Expected to Ease War's Demand for LP-Gas

By HAROLD W. WICKSTROM

Technical Editor, BUTANE-PROPANE News, Los Angeles

**T**HE war industries, synthetic rubber manufacture and high octane motor fuel production, have placed the LP-Gas industry and its products before the public eye during the last few months in such a manner that the terms butane, butadiene and isobutane are now in the vocabulary of most magazine and newspaper readers.

Many articles have been presented to the public in connection with the manufacture of as high as 800,000 tons of synthetic rubber per year and the production of aviation gasoline of high quality to fly 50,000 planes.

Both of these demands have a direct effect on the LP-Gas industry, and are one of the reasons for curtailment orders placed on the expansion of domestic and commercial usage.

A program is under way for the expenditure of close to \$700,-

000,000 for the construction of plants to produce rubber for war and civilian needs, the base product of which is butadiene.

This program is the outgrowth of experimentation in this country and the actual production and use of the synthetic products in European countries during the last few years. Chemical development has made it possible to rearrange the molecular structure of various hydrocarbons which has made possible the manufacture of both high octane gasoline and synthetic rubber.

Natural rubber is a mixture of many complex components and the exact proportions have never been determined. It has physical characteristics that are useful to us for many reasons and it is possible by the proper compounding with other materials and by vulcanizing to produce rubber products of various types.

The synthetic rubbers as developed are similar to the crude natural rubber and require additional compounding and treatment to make them serviceable for tires, hose and other various uses.

Butadiene is a liquid with a



H. W. WICKSTROM

boiling point of 25.5°F. and a vapor pressure at 100°F. or approximately 57 lbs. per sq. in. It is similar in appearance and as for handling has practically the same characteristics as normal butane. Its chemical formula is  $C_4H_{10}$ .

Butadiene can be produced from farm products through the steps of fermentation to alcohol and the further catalytic reductions of the alcohol to butadiene, a method that has been used in Russia. It can be made out of coal and limestone by first producing calcium carbide to make acetylene gas which in turn can be made into butadiene, and which is a process used in Germany. The method that most interests the LP-Gas industry is the dehydrogenation of butane and butene into butadiene.

Butene ( $C_4H_8$ ) is a part of the refinery gases resulting from the cracking operations and is often found in commercial refinery LP-Gas. It can be separated from the refinery gases by proper plant

equipment but few refineries have such equipment, as to the present time the market has not justified its separation.

Butene can also be produced from normal butane,  $C_4H_{10}$ , by heating the butane to cracking temperatures and passing the vapors through a catalyst chamber, resulting in the removal of hydrogen atoms to form the unsaturate.

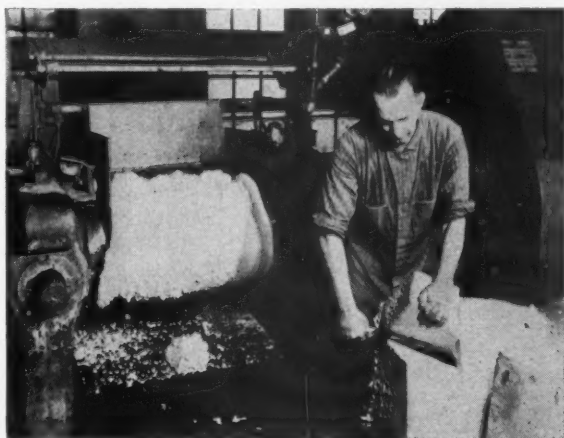
By further catalytic dehydrogenation butene can be made into butadiene which is the base material for "Buna-S" and "Butyl."

"Buna-S" rubber is a combination of approximately 75% of butadiene with 25% of styrene, which is a coal tar derivative. "Butyl" rubber is a combination of butadiene with iso-butene.

Both of these products have many of the characteristics of natural rubber and it is possible with further development that they can be improved to the point where they will exceed the performance of natural rubber for many uses.

To make 800,000 tons per year

▲  
Manufacturing synthetic rubber made from liquefied petroleum gas.  
▼





of synthetic rubber could require as much as 3,000,000 gals. per day of butane as charging stock. This amounts to over 1,000,000,000 gals. per year as against 462,852,000 gals., total of LP-Gas sold in 1941.

This requirement will be materially lessened for the following reasons:

It will take till the end of 1943, or longer, to build the plants and facilities necessary for the production of our rubber supply. In the meantime the oil industry is progressing rapidly in the change-over from the production of motor fuel to high octane aviation fuels which will result in the additional yield of butene at the refinery source. It is a possibility that sufficient butene can be recovered from the refineries direct to practically eliminate the need of cracking normal butane. This will be dependent upon the relative cost and the time required to obtain production from alternate sources.

In order to obtain production as fast as possible a certain amount of butadiene will be produced from farm products regardless of the difference in cost of production.

Due to curtailment of use of motor vehicles the demand for motor fuel will be materially lessened which will result in a lower consumption of natural gasoline for blending. An outlet for part of this material will be in the form of butane which will tend to balance the extra demand being made for rubber manufacture.

The present plant capacity for LP-Gases will very likely carry us through 1942 with little or no shortages.

The urgent need for isobutane in the manufacture of alkylate for aviation gasoline is going to require the recovery of additional LP-Gases in order to supply this demand which will result in the production and recovery of additional normal butane and propane.

The potential supply of LP-Gas is greatly in excess of the current demand and with additions to plants contemplated and being constructed, an uninterrupted supply for the present users is practically assured. The degree of expansion of use for domestic and commercial uses will be governed by the availability of critical materials going into the tanks and equipment necessary for storage and transportation and any curtailment in use of LP-Gases will more likely be due to a lack of transportation equipment to take care of the normal peak demands, plus the requirements for handling isobutane for aviation gasoline manufacture and butadiene for rubber manufacture.

It is entirely possible that temporary shortages may arise in various plants or districts due to abnormal demands for normal and isobutane, but these can be lessened by the use of propane or propane mixtures wherever the design of the storage tanks and transportation equipment is suitable for the higher vapor pressure products.

The eventual result of the new uses for LP-Gas will be to stabilize the price at the producer's plant and the increased demands from the chemical industry will result in the eventual recovery and use of a much greater proportion of the potential supply.



## Propane on the Railroad

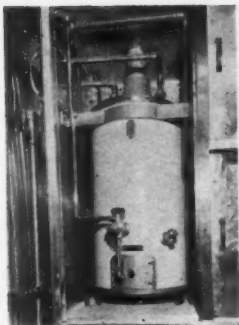
The "Land O' Corn" motorailer providing fast service between Waterloo, Iowa, and Chicago, uses LP-Gas for open top range and broiler, water heater and food warmer. Fuel cylinders are stored under the car.



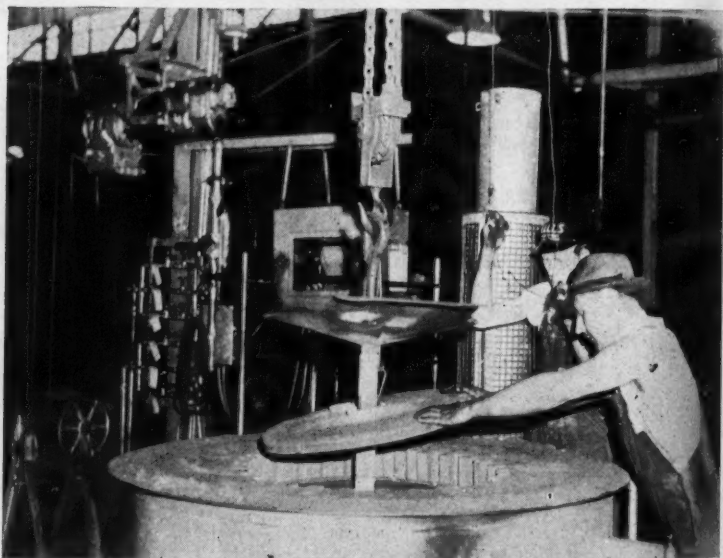
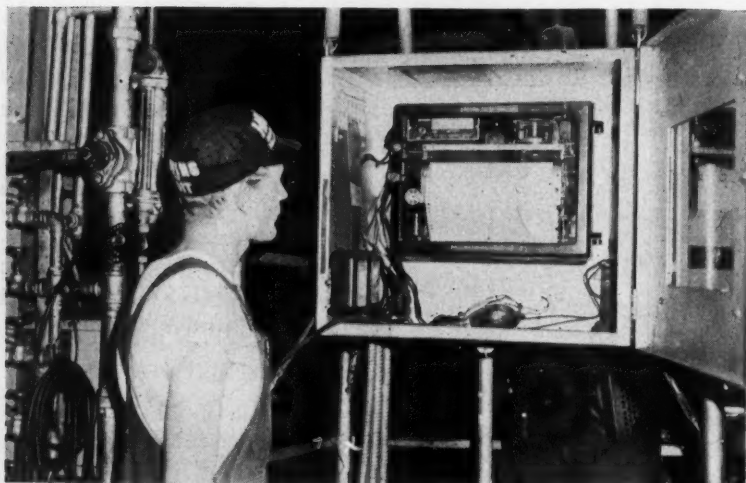
**TOP:** The buffet coach on the "Land O' Corn" has an 8-stool lunch counter and two booths.

**RIGHT:** The fully automatic, 9-gal. Ruud propane water heater, designed for fast recovery and limited space.

**BELOW:** This two-car motorailer was constructed by the American Car & Foundry Co. at St. Charles, Mo.



## Butane Aids Heavy Industry



Above: Inspecting Brown Instrument Co. potentiometer which records and controls temperature in the retort.

Below: Men in act of raising charge of carburized couplings.

# Carburize With Butane For Tough Sucker Rod Couplings

THE desire on the part of D & B Pump Division of Emsco Derrick & Equipment Co., at Dallas, Texas, manufacturers of sucker rods, couplings, pistons, plungers and other oil well pumping equipment, to produce a sucker rod coupling that really can "take it" leads the company to carburize them—and butane is used in the process in spite of the fact that natural gas is available in the plant and is used in other heating applications.

Carburization increases the carbon content of the steel on the outer surface of the coupling; and since butane is constant in carbon content and natural gas from different fields varies in carbon content, the greater-carbon-content fuel is naturally selected, according to the management.

While the sucker rod coupling is merely the unit which joins together the sucker rods that serve as the link between the prime mover at the surface of an oil well and the pump that is down at the location of the oil, it is this particular item that catches much of the brunt of the pumping process. The coupling has to slide up and down inside the oil well tubing, rubbing against the sides. It also has to be tough enough to withstand shock load impact incurred in the movement of the rods.

Each of the two carburizing fur-

By CRAIG ESPY

naces consists of a retort 24 in. in diameter and 82 in. deep made of high quality chromium nickel alloy. A fire brick wall 18 in. thick surrounds each retort. High pressure natural gas burners, 16½ in. high, are spaced up and down the retort. These extend through the furnace wall and are located 90° apart.

Butane is piped into the bottom of the retort coming up through holes of a perforated distributor plate. These provide an even distribution of the gas inside the retort. The furnace, itself, extends 6 ft. under the floor and about 2½ ft. above the floor.

The capacity of each retort is approximately 2 tons which in number of pieces amounts to something more than 1000 units. The couplings are slipped over removable rods that are attached to an alloy supporting fixture. Then they are charged into the retort.

When the charge is lowered into place the cover plate of the retort rests in a sand seal. The fixture that supports the "charge" is in turn supported from an overhead hoist by a single alloy bar that passes through the cover plate in a sand sealed joint. The retort and charge are preheated to 1700° F. by means of 16 high pressure nat-

ural gas burners. After reaching the carburizing temperature this temperature is maintained constant by means of recording temperature controllers with the two thermocouples being located near the bottom and top of the retort.

Butane is turned into the retort when 1700° F. is reached. At this temperature butane ( $C_4H_{10}$ ) breaks down into carbon and hydrogen. The carbon in the form of soot surrounds the pieces to be carburized and increases the carbon content of the steel about 3/64 in. in depth. The liberated hydrogen is piped off from the cover plate and burned. The process continues for eight hours with the temperature of the retort being held constant at 1700° F. After the furnace and charge cools down, which requires four hours, the pieces are cleaned and machined to

proper dimensions. They are then hardened by heating and then cooling rapidly in an oil bath. After completion they are sent to the assembly or stock room as finished hardened oil well pump parts. All pieces receive 3/64 in. penetration with practically no variation within a charge or from one charge to another.

Two standard Stargas Service units (250 gal. butane evaporator tanks) are used to supply service. These are filled by the regular butane delivery truck every month or five weeks. The regulators are set to deliver gas at approximately 5 lbs. pressure. This necessitated the installation of special relief valves on the low side of the regulator.



#### **A.G.A. Laboratories Test Air Conditioning Equipment**

Mechanical means for duplicating summer temperature and humidity conditions have been constructed and are now being employed at the American Gas Association Testing Laboratories in conduct of research in gas summer air conditioning equipment.

It embodies recommendations of the American Society of Refrigerating Engineers and is used to determine cooling effect of a gas summer air conditioner. It is capable of producing practically any temperature and humidity condition desired.



#### **Calif. Produced 43,000,000 Gals. Of Natural Gasoline in June**

Natural gasoline production in California during June totaled 43,338,090 gals. This was from 87 plants processing a total of 25,829,624,000 cu. ft. of gas.

Daily capacity of the plants is 1,986,800,000 cu. ft.



Looking at liquid capacity gage to determine how much fuel is in the butane tank. Both tanks shown are butane tanks.

# Latest News From Washington

## Order Prohibits Manufacture Of Domestic Space Heaters

The War Production Board on Aug. 5 issued Limitation Order L-173, cutting off further production of domestic space heaters calling for the use of fuel oil or gas except to fill orders for Government agencies.

Types of heaters covered by the order are those designed to heat only the space in which they are located and which are not equipped with distribution pipes. Included are circulating heaters, radiant heaters, direct fired gas unit heaters, and floor and wall furnaces.

The order permits the production of replacement parts so that units now in operation can be kept serviceable.

The Plumbing and Heating Branch estimates that manufacturers and dealers have stocks of 200,000 oil heaters and 300,000 gas heaters on hand.



## Amendments Issued to Orders L-79, L-83 and P-84

Two amendments to Limitation Order L-79, covering certain plumbing, heating and cooking equipment, were issued Aug. 11 by the War Production Board.

The first amendment includes in the terms of the order cooking and baking equipment using coal, oil or gas. Previously only those types of cooking or baking equipment connected to gas or steam systems were covered.

The other amendment includes the following gas-burning heating equipment in the terms of the order: steam and hot water heating boilers, warm air furnaces, floor furnaces, unit heat-

ers, conversion burners, and gas steam radiators.

An additional exception, which permitted the sale of oil burners when such transactions were made for the purpose of reducing consumption of fuel oil, was revoked by Amendment No. 2.

Industrial baking ovens and other types of industrial baking machinery are not covered by the terms of the amended order, since they are regulated by General Limitation Order L-83.

Issuance of Amendment No. 1 to Preference Rating Order P-84, providing for preference rating assistance in connection with repair and maintenance of cooking and baking equipment, was also announced by the WPB.



## Amendment No. 1 Is Issued To WPB Order No. L-86

By an amendment which became effective Aug. 15, the WPB changed the method of applying for relief from the restrictions of Order L-86 by amending that part of Paragraph (d) (5) which previously required application to be made by letter and for information concerning the application to be submitted on Form PD-397, according to a bulletin of the Liquefied Petroleum Gas Association.

The WPB also amended Paragraph (f) by striking out the reference to Preference Rating Order P-98. This change now makes it possible for oil producing companies to order LP-Gas equipment under the terms provided by Preference Rating Order P-98. The use of this Order is restricted to oil producing companies.

Form PD-397 (revised) is a printed form and members of the industry

who require copies should obtain them either directly from the WPB, Washington, D.C., or any Field Office.

### **Heat Exchangers Placed Under System of Complete Allocations**

Heat exchangers, urgently needed in war industries and by the army, navy and maritime commission, were placed under a system of complete allocations Aug. 5 by order of Amory Houghton, Director General for Operations. Requirements of the war program have put a severe strain on existing supplies, since they use considerable quantities of scarce metals.

The order (L-172) prohibits the placing or acceptance of orders for heat exchangers covered by the regulations unless specific authorization is granted by the Director General on Form PD-615A. Application for authorization to place orders must be made on Form PD-615.

### **Increase of Butyl Rubber Is Given WPB Approval**

The War Production Board has approved plans of Standard Oil Co. of New Jersey and affiliated companies to increase the planned production of butyl rubber by 70,000 tons above the rate originally scheduled.

This increase will necessitate no new construction but involves the use of improved techniques previously announced by Standard.

### **Order L-63 Is Reissued With Amendments Included**

To make it simpler for distributors to operate under Suppliers' Inventory Limitation Order L-63, that order was reissued Aug. 13 in a form which brings together in one document the various amendments and exemptions which have modified its terms since it first went into effect last April.

### **President Roosevelt Appoints Special Rubber Commission**

Confusion in the public mind over the rubber situation in the nation will be clarified, it is hoped, by a special committee appointed Aug. 6 by President Roosevelt to study the several proposed programs for making synthetic rubber, especially that of using grain alcohol in addition to, or instead of, petroleum products.

The committee consists of Bernard M. Baruch, Dr. James B. Conant, president of Harvard University, and Dr. Karl T. Compton, president of Massachusetts Institute of Technology.

### **Draft Boards Will Consider Importance of Positions**

If a draft registrant is engaged in an essential activity, consideration will be given to the occupation of that registrant within the industry, and if he is found to be a "necessary man," as defined by selective service regulations, he may be granted occupational deferment.

Under certain circumstances members of the LP-Gas industry may be so considered.

### **New Standards Set For Truck Operation**

Revised standards for conservation of trucks operated by contract and private carriers in both local and over-the-road service were set up in a new order issued July 23 by the ODT.

The new order (General Order ODT No. 17) will supplant General Orders ODT Nos. 4 and 5, governing over-the-road operations of contract and private carriers, and those portions of General Order No. 6 which govern local delivery operations of such carriers.

General Order No. 17 requires that on and after August 1, trucks oper-



ated by contract and private carriers in over-the-road service be loaded to capacity on a considerable portion of the trip out or back and that the operator use due diligence to obtain full load over the entire round trip.

On and after Sept. 1, contract and private carriers must endeavor in good faith to rent or lease a truck prior to its departure from any point without a load. This will include registering any truck for which no load has been obtained with a Joint Information Office and, in the event no such office has been established in the vicinity, making appropriate inquiries of other carriers.

As in Order No. 3 Revised, covering common carriers, all operators affected by Order No. 17 must:

1. Eliminate wasteful operation and duplication of parallel services, and curtail schedules and services to the extent necessary to comply with the order.

2. Limit the speed of trucks to 40 miles an hour.

3. Conserve and properly maintain tires and equipment.

4. Lease or rent their motor trucks whenever practicable or necessary to comply with the order.

#### **Call-Backs Now Permitted**

A general permit allowing repair and service trucks to make call-backs was issued Aug. 12 by the Office of Defense Transportation.

The permit, the thirteenth one issued under General Order ODT No. 17, applies only to trucks "engaged exclusively in the transportation of repair or service men and their supplies or equipment."

#### **Scrap Rubber Drive Nets Nearly Billion Pounds**

"The petroleum industry deserves enthusiastic congratulations and commendations for its splendid work as

well as for its accomplishments," Donald M. Nelson, chairman of the War Production Board, wrote on hearing the results of the industry's scrap rubber drive.

The total collection by the petroleum industry was 454,155 tons (908,310,000 lbs.) of scrap rubber. This amounted to 6.87 lbs. for each man, woman and child in the United States. It will furnish work for the present rubber reclaiming plants for a year.

Only the scrap rubber actually moved to the petroleum bulk plants and weighed was included in the 454,155 tons reported.

The western states of Nevada, Oregon, Idaho and Montana led the scrap rubber collection drive on a per capita basis. The eastern states of New York and New Jersey made the poorest showing, while the middle western states of North Dakota and Kansas ranked near the top.

Oil companies in Nevada collected 30.13 pounds per capita, while the New York receipts were 2.88 per capita. Hawaii, with a population of 433,000, collected 1464 tons of rubber, while the District of Columbia with a population of 663,000 was collecting 1091 tons.

Th leading states on an actual tonnage basis were California, 40,247; Illinois, 27,800; Texas, 27,685; and Ohio, 22,165.

#### **LPGA Re-Elects Officers**

At the first meeting of the new executive board of the Liquefied Petroleum Gas Association, officers who served last year were re-elected, except that Ernest Fannin succeeded C. L. Parkhill as vice president. Mr. Parkhill declined to serve again.

The officers for the ensuing year are Geo. W. Bach, president; Ernest Fannin and Ellsworth L. Mills, vice presidents; F. R. Fetherston, secretary.

# Show Your Best Model First

**I** DO not lay any claim to being the originator of this idea, but I have found it to be very satisfactory in the sales presentation of gas ranges. It has been my habit for some time to assume that when a prospective purchaser comes into our store looking for a gas range that she automatically is expecting to see something better than she expects to purchase, and assuming this I attempt to show her the finest, most expensive piece of equipment we have on display.

## Always Ready to Demonstrate

In our demonstration room we have connected up and ready for immediate use at all times a deluxe model range so that the "extras", or better cooking features, found in these ranges can be demonstrated and elaborated upon without necessarily attempting to sell the customer on that particular model range. Now, since all people respond in varying degrees to features, I have found almost without exception that a prospect whose mind is more or less fixed on the purchase of a \$75 range can be induced to listen to a story about ranges and watch a demonstration on a \$200 range. After the demonstration is completed, if the higher priced range is still beyond her reach financially, I have found it good practice to use a statement of this kind:

"Mrs. Prospect, the range that I am showing you here is just like the range that you looked at in the

By C. L. DONALDSON  
Edwards Gas Appliance Co.  
San Antonio, Texas

demonstration room, *except* it does not have the marvelous deep barbecue broiler; it does not have the deluxe appearance and other features that you noticed were so outstanding on the other range."

If this range is still too high in price I then take the customer to the next range down the price scale, again saying:

"Mrs. Prospect, this range is identical to the last one you looked at, *except* it does not have . . ." and then I point out the features this range is lacking from the previous one. By this time we are beginning to get into the ranges in the moderate price class, and then when I point to the next range down the price scale I say:

## How the Sales Talk Goes

"Mrs. Prospect, this range is identical with the last one that you looked at, *except* that it does not have a sealed oven, it does not have a timer alarm, and . . ." and then I point out the various other things that it does not have as compared to the higher priced range. It has been my experience that in following this procedure of showing the prospective purchasers what they can expect in the finest range that they can buy, and then comparing all other models with it, that shortly there are enough exceptions built up in the purchaser's mind

that anything short of the deluxe job seems to be rather plain.

In our store we have the good fortune of having a clientele that looks for quality merchandise; people who expect something better when they come into the store. Perhaps that is the major reason for the success of this selling procedure; however, I have found that the prospect who knows beforehand, and who, I am convinced after talking with her a few minutes, cannot pay over \$69.50 for a range, appreciates the fact that I appear to assume that she can and will buy a \$200 range. The effect often raises the sale to \$125 or to a \$150 job.

Salesmen will be surprised to see that, when their prospect goes to their competitors seeking something *just as good* for a little less, the "exceptions" you pointed out as being a part of your better gas range would be so numerous that a story told with less drama and less enthusiasm will seem drab by comparison.

## More Laboratories Engineers Join Armed Forces

The honor roll of engineers of the A.G.A. Testing Laboratories in the armed forces has been increased to 21 with F. E. Hodgdon, H. L. McPherson, and G. A. Duncan entering various branches of the service.

Frank E. Hodgdon, a member of the staff since January, 1939, was called to active service late in July. A reserve officer with the rank of second lieutenant in the coast artillery, he will be stationed at Fort Eustis, Va. Lieut. Hodgdon is a graduate of Georgia School of Technology.

Howard L. McPherson was recently commissioned a second lieutenant in the Signal Corps. He is a graduate of Tri-State College. Lieut. McPherson joined the Laboratories staff in January, 1939, and resigned in December, 1941, to become a navy inspector.

George A. Duncan joined the staff in December, 1941, as a draftsman and resigned in June, 1942, to enlist in the navy. He is receiving his basic training at the Great Lakes Training Station preparatory to becoming a gunner in the naval air service.



Bulk plant and transport of Harry I. Horn, Anaheim, Calif.

# THE BOTTLED GAS MANUAL

## Chapter 14

## Interesting Facts About Water Which Concern Water Heaters

**W**ATER is one of the elements upon which humans, animal life and vegetation depend for existence. It specifically concerns our study of the applications of liquefied petroleum gas because one of the most important functions of this fuel is its use in the modern water heater.

Water is made up of hydrogen and oxygen. Hydrogen is also a principal part of propane, and is the hottest burning gas known. Oxygen is necessary for the support of combustion.

The fact that water expands when freezing is of vital importance in the operation of any water system. The maximum density of water occurs at 39.1°F., at which point it starts to grow lighter and at the freezing point, or 32°F., it has expanded appreciably over its original liquid volume.

*The Purity of Water.* While we often speak of the purity of water, such a thing does not exist outside of our laboratories. There are tiny motes of matter in the air which the rain picks up in its descent.

When it strikes the earth it picks up more particles. Here is where we must differentiate between matter which it holds in *suspension* and that which it holds in *solution*. Water is an excellent solvent and many substances readily dissolve in it. Matter held in suspension does not affect the chemical properties of water and may readily be removed from it by passage through a suitable filter. Substances which enter into solution with water cannot be removed by filtration. Some of them may be removed by heating, boiling, or distillation. Others cannot be removed in this way and require the addition of other chemicals in order to change them into something else which may be easily removed. It is the substances held in solution which determine whether or not a water is soft or hard, acid, alkaline, or neutral. Water may be either soft or hard, and still be acidic, alkaline, or neutral. Let's consider some of these various waters and what their qualities are in reference to water heating.

*Soft Water.* You and I judge the relative softness of a water by the way in which it reacts to soap. If it is possible for us to quickly generate a lot of soap suds we say that the water is "soft." While this is true, and soft waters do not have as much foreign matter in

- The Bottled Gas Manual series by C. C. Turner, started in the July, 1941, issue of BUTANE-PROPANE News and will continue to be published monthly in chapter form until completed. This series constitutes a valuable text book and field manual that should be invaluable to everyone in the liquefied petroleum gas industry.—Editor.

them in solution as do hard waters, it is still possible for them to have chemicals in them that will react unfavorably on galvanized, copper, or brass piping. The presence of soda and potash salts makes a water soft, but these same salts may injure a water system due to electrolytic action under certain conditions of temperature or combinations of materials. Soft water is also apt to have an excess of free or dissolved oxygen in it, and there are instances where the presence of this oxygen alone has been the cause of excessive oxidation of steel pipes and tanks. Only by a laboratory analysis can we tell whether or not a soft water is apt to be corrosive, and even then the best guide is the actual experience of our neighbors who have used the same water source.

All other factors being equal, we of course prefer a soft water because of its reaction with soap as a cleansing agent, but there are conditions under which it might be well for us to choose a harder water if we had available both kinds.

**Hard Water.** The cause of water hardness is usually the presence of magnesium or calcium compounds. If these are carbonates they may be removed by boiling the water, in which case we speak of the water as being temporarily hard. If, however, they are sulphates they cannot be so removed, and we speak of the water as being permanently hard. If the question arises as to whether or not a supply of water is temporarily or permanently hard, examine a teakettle which has been in use for some time. If there is a brownish de-

posit on the sides and bottom you may be quite sure that this is calcium carbonate and the water is temporarily hard.

Contrary to general opinion, a hard water is *sometimes* better in a water heater than soft water. It will form a thin protective coating on the interior of the water heater and help prevent corrosive action.

**What to Expect from Foreign Matter in Water.** Perhaps it might be helpful to us to place in tabular form the most common foreign matter found in water and what we may expect of it in a hot water system. (See Table 1.)

**Selection of Proper Materials for a Water System.** Scale and deposit will occur in spite of the material of which water pipes and tanks are made, and have very little bearing, if any, on the deterioration of a water system. Corrosion is an entirely different matter. Monel metal, stainless steel and copper are quite resistant to corrosion, but even copper under some conditions will cause a green discoloration or sediment. For this reason copper for water tanks is usually alloyed with some other metal, and in this form is extremely resistant to corrosion or discoloration. Brass should not be used where there is an acid condition for it is made up largely of copper and zinc. Acids have a very great affinity for zinc and therefore attack brass readily, leaving it spongy and porous and extremely brittle. Corrosion is increased by heat, and there are instances where brass pipe will give excellent results on the cold water lines but will deteriorate rapidly



on the hot water lines. On the cold water lines a difference in the metals used is generally not important, but on the hot water side it is good practice to use but one metal throughout. A combination of brass and copper, or either of these with steel, under acid conditions will quite often cause an electrolytic action and consequently hasten the deterioration of brass pipes. Galvanized steel is in reality zinc-coated steel, and therefore under acid conditions galvanizing disappears rapidly.

It will be noted from all of this that the material of which a water system is constructed is important. The deciding factor is the chemical content of the water, coupled with an observation of the experience of others in the same locality.

*The Physical Properties of Water.* In the ensuing studies we

shall often have need of an intimate knowledge of the physical properties of water and pressures at various depths. While we have mentioned many of them previously, let's get them all together in one place for easy reference, as given in Table 2.

*The Action of Hot Water in Personal Cleanliness.* The pores of our skins are great eliminators of waste. If we should plug them all tightly we would quickly die, due to the accumulation of poisonous wastes within our systems. When we are perspiring we realize this functioning of the pores, but few of us realize that even though we are not perspiring this activity of the pores continues. If you wash your hands off with gasoline and then dry them your skin feels tough and dry. This is because the gasoline has dissolved oils brought to

**TABLE 1. CAUSE AND EFFECT OF FOREIGN MATTER IN WATER**

<i>Foreign Matter</i>	<i>Its Effect</i>
Bicarbonate of lime	Scale and deposit
Bicarbonate of magnesia	Scale and deposit
Bicarbonate of iron	Scale and deposit
Carbonate of soda in excessive amounts	Foaming and some deposit
Mud, clay and organic matter in suspension	Mostly deposit, and some scale Organic matter may cause foaming or corrosion
Soluble salts	Scale. If in excessive amounts, some deposit
Sulphate of lime	Scale and deposit
Chloride of magnesium	Corrosion
Sulphate of magnesium	Corrosion
Carbonic acid	Corrosion
Dissolved or excess oxygen	Corrosion
Traces of oil	May cause scale, or corrosion, depending on its chemical content
Traces of sulphuric or hydrochloric acid	Corrosion



the skin through the pores and completely removed them even below the surface. A certain amount of these oils in a clean, fresh, condition is essential to a healthy skin, but the older layers which become incrustated and hardened upon the surface of the skin, together with the fleckings of dead skin, must be removed; otherwise, they plug the pores and result in skin blemishes, disagreeable odors, and contribute to ill health.

There is an old saying that "oil and water will not mix." While this is not strictly true in the presence

of certain other types of matter which cause a reaction resulting in emulsification we are for the moment simply considering the action of water on the stale, solidified oils which accumulate upon our bodies. Here the action of water, itself, is primarily a *physical* and not a *chemical* one. The water must put these solidified oils in a liquid from so that the soap can emulsify with them. If the water is cold it will not melt or liquefy these hardened oils, but if it is warm or hot the heat of the water will help to liquefy them. This is the reason

**TABLE 2. WEIGHT OF WATER**

<i>Temperature</i>	<i>Quantity</i>	<i>Weight</i>
32°F. (freezing)	1 cu.ft.	62.418 lbs.
39.1°F. (greatest density)	1 cu.ft.	62.425 lbs.
62°F. (standard temperature)	1 cu.ft.	62.355 lbs.
212°F. (boiling point at 1 atmosphere pressure)	1 cu.ft.	59.76 lbs.
62°F.	1 U.S. gallon (231 cu.in.)	8.3356 lbs.
62°F.	1 British gallon (277.274 cu.in.)	10.00 lbs.

**Pressures of Water Caused by Various Depths**

<i>Depth of Water</i>	<i>Temperature</i>	<i>Pounds per Sq.In.</i>	<i>Ounces per Sq.In.</i>	<i>Pounds per Sq.Ft.</i>	<i>Inches of Mercury at 62°F.</i>
1 in.	62°	.03609	.5774	5.196	.0736
1 in.	32°	.036125	.5780	5.2021	....
12 in.	62°	.433	6.9288	62.355	.8832

1 cu.ft. contains 7.4805 U.S. gals. or 6.2321 British gals.	Boiling point of water under 1 atmosphere pressure ... 212°F.
Specific gravity of ice at 32°F. .... .922	Latent heat of vaporization, B.t.u. per lb. of water.... 970.4
Specific gravity of water at 62°F. .... . 1.00	Mean coefficient of cubical expansion per degree rise of temperature between 32° and 212°F. .... .00025
Specific heat of ice at 32°F. .5040	Compressibility is but slight, varying between .000040 and .000051, decreasing as the temperature rises.
Specific heat of water at 62°F. .... . 1.00	
Melting temperature of ice 32°F.	
Latent heat of fusion, B.t.u. per lb. of ice.....142.65	

why it is so much easier to cleanse ourselves and our clothes with warm water and soap than it is to do so with cold water. It is easier to accomplish this with soft water than with hard water. Soft water readily dissolves soap and carries it in solution to the oils for the purpose of emulsification. Hard water does not dissolve the soap and therefore does not carry it to the oils for emulsification. Hot hard water softens and melts these solidified oils just as readily as does soft water, but it does not carry the soap to these oils; hence, washing under these conditions becomes a physical, instead of a chemical operation, and the oils removed are dislodged by rubbing or scraping.

At this point perhaps a word to milady might not be out of line. There is many a pretty face which never sees a drop of water and complete reliance rests in certain cosmetic creams for cleansing. There is no question but that certain skins require artificial stimulation by massage and the presence of externally applied oils for adequate protection, but an understanding of the action of one oil upon another is convincing that this method does not remove all of the stale oils. The action of one oil upon another is that of *dilution*, but it is absolutely impossible to completely remove one oil by the application of another one. In spite of all the rubbing you can do a film of the diluted oil will remain; hence, some of these stale oils will still be present. To milady I say, "Use your creams, your skin tonics, your rouges and other beautifiers, but first remove the stale oils and

freshen your skin by the liberal use of warm water and a good soap."

*Hot Water, but How Hot?* The temperature at which we use hot water depends upon our purpose in using it. The ordinary cleansing of our bodies is one matter; the washing of clothes requires a different temperature and the killing of germs calls for other levels of heat. The normal temperature of the human body is  $98.6^{\circ}\text{F}$ . If that temperature drops as little as to  $97^{\circ}$  we experience chills and are in extreme danger. If a fever raises our body temperature to  $106^{\circ}$  our bodies literally burn up, and death may ensue! Note what an extremely small range this is—only  $9^{\circ}$ , yet this wonderfully complex body of ours is so delicately balanced that in spite of extremes of external heat or cold it maintains an even temperature in health of  $98.6^{\circ}$ . I make mention of these facts to bring out how extremely sensitive we are in relation to temperatures. If the temperature of the air is  $90^{\circ}$  and we go swimming in water of  $80^{\circ}$  temperature we actually feel that the water is *cold* when we first enter it! Because of this great sensitivity we are apt to greatly misjudge the temperature of the water which we are in the habit of using, for we know that in nature's scale of things a difference of heat level of  $1^{\circ}\text{F}$ . is a mighty small gradation. In order to satisfy yourself as to the truth of some things which I am about to say concerning water temperatures for general household use, buy a dairy thermometer (they are very inexpensive) and conduct

some experiments in your own home. You will find that the "scalding" hot water in which you wash the dishes is uncomfortably warm to your hands (which are probably the least sensitive part of your body) at 125°F., and that the temperature of the "hot" water in which you wash your hands and face is probably from 110° to 112°! Let's look at Table 3 which shows customary temperatures.

*Hot Water, How Much?* There are at least eight variables which govern the amount of hot water used in any home.

- A. The climate in which the home is located.
- B. The personal habits of its inmates as to sanitation and cleanliness.
- C. The occupation of its inmates.
- D. The social habits of its inmates.
- E. The presence of children in the family.
- F. The presence of servants in the family.
- G. The residence of those who are not immediate members of the family.
- H. Illness of any of the inmates.

**TABLE 3. CUSTOMARY DOMESTIC TEMPERATURES FOR HOT WATER USAGE**

<i>Purpose of Use</i>	<i>Usual Temperature</i>	<i>Purpose of Use</i>	<i>Usual Temperature</i>
Bathing, tub, cold .....	92	Mopping floors .....	125
tepid .....	99	Miscellaneous cleaning ...	135
warm .....	104	Laundry by hand .....	145
hot .....	110	Laundry by washing machine .....	165
very hot ...	115	Rinse by washing machine	170
Baby bath .....	110	Rinsing lingerie by hand..	120
Shower bath .....	110	Dishwashing .....	125
Washing hands and face..	115	Rinsing dishes .....	145
Lathering for shaving....	125	Scalding dishes*** .....	165
Hot towels for shaving....	145	Actual scalding .....	212
Shampoo, man .....	125	Pasteurizing milk**** .....	145
Shampoo, woman .....	135	Sterilizing .....	212

**Customary Commercial Temperatures for Hot Water Usage**

<i>Purpose of Use</i>	<i>Usual Temperature</i>	<i>Purpose of Use</i>	<i>Usual Temperature</i>
Dishwashing, restaurants..	198	Office lavatories .....	145*
Scalding dishes .....	212**	Factory lavatories .....	125*
Hotel lavatories only .....	145*	Hotels with bath.....	165*

\*= Carrying temperatures only. The temperature of usage will not differ from a home, and tempering with cold water is required.

\*\*= Varies in various states as a requirement. Suggest that you consult state and local bodies governing hotel and restaurant requirements.

\*\*\*= The average temperature used by the housewife.

\*\*\*\*= Temperature that would actually be required to do a real job of sterilizing. The above temperatures as given are the result of actual tests made in many homes, restaurants, offices and factories.

Perhaps it might be well for us to consider each one of these, for sometime we may be called upon to explain to some inquiring prospect the reasons for certain recommendations that we may make.

A. *The Climate in Which the Home Is located.* The colder the climate, the less hot water is used by persons of the same habits. This is for the reason that in cold climates our bodies do not eliminate as many wastes through the pores; hence, we do not require the same quantities of water for personal cleanliness and our clothes do not soil as quickly.

B. *Personal Habits of the Inmates as to Sanitation and Cleanliness.* This is largely a matter of training. There are those that believe in cleanliness only so far as filth is not visible to the eye or objectionable to the nose. Obviously such people will not use as much hot water as those who have well grounded convictions as to both its desirability and necessity.

C. *The Occupation of the Inmates.* If there is an equal appreciation of cleanliness in each of two homes it is natural that more hot water will be used by the fireman than by the banker.

D. *The Social Habits of the Inmates.* Those who go in for social functions, parties, and entertainment will require greater quantities of hot water than those who live quiet lives at home.

E. *The Presence of Children in the Family.* They aren't normal if they don't play and get into the dirt. Their little bodies require more hot water, their clothes must be washed more often, and furthermore, Junior isn't going to be careful about not wasting hot

water, for Junior isn't paying the bills!

F. *The Presence of Servants in the Family.* Servants are probably not any more wasteful in the use of hot water than are we, ourselves, although many statements have been made to the contrary by eminent water heating specialists. They do, however, in all probability, use more hot water than we do, because we exact from them standards of cleanliness which we are not apt to live up to, ourselves.

G. *The Residence of Those Who Are Not Immediate Members of the Family.* By such people I mean those who are "roomers," "boarders," or hotel guests. It shouldn't be so, but I fear that under such conditions we are apt to be wasteful of hot water. Perhaps this is because of a feeling that we are paying for it and wish to get our money's worth!

H. *Illness of Any of the Inmates.* Modern medical practice insists upon cleanliness, and it is the first rule of the sick-room. Bed linen, towels, blankets and bedroom apparel are in a constant procession to the washing machine, and such things, as well as dishes, must be sterilized.

*Contradictory Claims as to the Amount of Hot Water Necessary.* We still haven't answered this question, "Hot water, how much?" I have purposely avoided saying anything definite on this until after bringing all of these variables to your attention. It is quite obvious that there can be no hard and fast rule as to hot water consumption in view of all these conditions that may alter it. There are several service manuals in circulation

which make specific recommendations in this respect, but to show you how these vary I submit the tabulation in Table 4, and you can judge which is right.

All of those figures mean what? *Nothing*, but bewilderment to you and me in view of the contradictions. Whom should we believe? Whose values should we take? All of the authorities quoted are without question successful merchandisers of water heating, and each one's recommendations work well for him in the territory which he is serving, yet in figuring consumptions in West Overshoe, Maine, or South Earflap, Texas, what set figures should we take?

The variables mentioned, and the dissensions among the authorities on quantities used have given birth to a second school of thought—that which bases its recommendations on the physical equipment served. By this is meant the number of rooms and lavatories. The American Gas Association has provided us with a very excellent manual compiled upon this basis, and at least one major water heater manufacturer follows this same method. This method has met with excellent results, due to the fact that while "x" gallons of water may not be used in the extreme north and more than "x" gallons of water may be used in the extreme south, the difference in ground or inlet temperatures serves as a compensating medium. The movement of populations to industrial centers under the present emergency conditions is, however, distorting this method of computation, due to the crowding of people into living accommo-

dations originally designed and intended for half of their number.

Where population conditions are stable I am in favor of computations based upon the recommendations of the American Gas Association\* and the Hotstream Heater Co.,\*\* but in industrial areas I believe the prosaic and more laborious method of determining hot water consumption on the basis of people served and a fair analysis of their living habits and conditions will be found to be the more accurate.

What should be the basis of hot water consumption estimates? A bath is a bath, whether it be in Africa or Alaska, and it should take the same amount of a certain temperature of water in either place. Somewhere between the limitations of quantities will be found the correct answer, and it is up to us to analyze the needs of the prospective gas water heater purchaser and decide from our analysis what quantities he will use. (See Table 5.)

*At What Temperature Should Domestic Hot Water Be Carried?* Let's analyze the foregoing and draw some conclusions. The highest temperature required is 170° and at first thought one might think that this should be the carrying temperature, but is it? This temperature is only required for rins-

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\*I here refer to "Industrial Gas Series Water Heating," a publication put out by the American Gas Association.

\*\*Everyone interested in water heating should procure a copy of the Hotstream catalog and acquaint himself with the fine information on this subject given in the back of the catalog.

ing clothes, and if we follow the general American custom of having one laundry day a week, wouldn't it be better to carry hot water at a lower temperature for six days in the week, and be able to carry it at 170° by a thermostat setting on the seventh day? The next lower temperature requirement is 165°, but note the very small amount required for scalding dishes. Wouldn't it be better to draw this small amount of water from the hot water tap at a temperature of 145° and raise it to 165° over the range burner, thereby avoiding carrying a large quantity of water at 165° seven days a week, 24 hours a day? The next lower temperature required is 145°, and we need this at least three times a day and in appreciable quantities. I would say that this should be the top temperature in our hot water storage system for six days a week, and by top burner heating for scalding dishes and setting up the thermostat on the seventh day we may arrive at some real economy in gas-

fired water heating. Furthermore, the life of the water heating system will be appreciably longer under this low carrying temperature.

*Tempering Hot Water.* When we say that we need 15 gals. of 108° water for a bath it is obvious that we are not going to draw 15 gals. of 145° water from the water heater. Just how much are we going to need? This depends upon the temperature of the cold water.

By way of example, let us say that the incoming cold water has a temperature of 45°. From somewhere 15 gals. of water coming in at this temperature must acquire  $15 \times 8\frac{1}{2} \times 63 = 7875$  B.t.u. If 1 gal. of 145° water should be cooled to 45° it would give off  $1 \times 8\frac{1}{2} \times 100 = 833.33$  B.t.u. If we acquire the entire 7875 B.t.u. needed by doing this we would have to cool down

$$\frac{7875}{833.33} = 9.45 \text{ gals. of hot water, so}$$

to get 15 gals. of 108° water we would only need 9.45 gals. of 145°

**TABLE 4. AMOUNT OF HOT WATER USED FOR COMMON NEEDS**

<i>Purpose of Use</i>	<i>Statement by Authority as to Gallons Used</i>		
	<i>A</i>	<i>B</i>	<i>C</i>
Bathing in tub.....	15	10	15
Baby bath .....	4	3	4
Shower bath .....	11½	7 to 24	12 to 24
Washing hands and face .....	.....	2	¾
Lathering and shaving.....	.....	.....	1½
Hot towels after shaving.....	.....	.....	2½
Shampoo, man .....	.....	.....	2
Shampoo, woman .....	.....	.....	3½
Mopping floors .....	2 to 5	.....	4
Miscellaneous cleaning .....	.....	5	3
Laundry by hand, per person.....	.....	.....	7
Dishwashing, per person.....	2-2/10	½	¾
Weekly laundry, per person .....	3 to 7	.....	.....
Weekly laundry for family.....	.....	14 to 22	7 to 30



**TABLE 5. HOT WATER USAGES WITHIN CUSTOMARY LIMITATIONS**

Purpose of Use	Quantity Limitations in Gals.		Usual Temp.
	Minimum	Maximum	
Tub bath .....	10	15	108
Shower bath .....	10	24	110
Needle spray shower bath.....	12	24	108
Baby bath .....	3	4	110
Washing face and hands.....	0¾	2	115
Lathering and shaving.....	1½	2	125
Hot towels for shaving.....	2½	3	145
Shampoo, man .....	2	3	125
Shampoo, woman .....	3½	5	130
Sponge bath .....	3	4	110
Washing lingerie by hand.....	2	3	120
Mopping floors .....	2	5	125
Washing dishes, per person per meal	0½	2	125
Rinsing dishes, per meal per person	0¼	1	145
Scalding dishes, per person per meal	0¼	1	165
Weekly laundry, per person.....	3	15	165
Rinsing laundry, per person.....	3	15	170

water from the heater and 5.55 gals. of water from the cold water faucet.

While the accurate way to figure such things is by some such method, sometimes we wish to arrive at approximations in a hurry. For this reason let us consider Table 6, "Percentages of Hot and Cold Water to Obtain Desired Temperatures of Tempered Water."

*How to Use This Table.* Let us say that we have an incoming water temperature of 50°, a hot water temperature of 145° and we want 90 gals. of 130° water. To find out how many gals. of 145° water we will have to use we proceed with the table as follows.

The difference in temperature between the hot and the cold water is  $145 - 50 = 95^\circ$ . The number of degrees which the hot water will have to drop is  $145 - 130 = 15^\circ$ .

Follow down the "Degrees Temperature Between Hot and Cold

Supply" column until you come to 95, then follow this line over until you come to the nearest figure to 15 which happens to be  $14\frac{1}{4}$ . Following this column back to the head of the chart again we find that approximately 85% of the total 90 gals. will have to be 145° water from the heater, or  $.85 \times 90 = 76.5$  gals.

Of course this is only approximate. A table could be computed for every degree of difference and every percentage, but it would require approximately 40 printed pages. Estimating within 5%, as is possible with this chart, will be sufficiently accurate for most jobs.

What have we learned this evening concerning this fluid from which all life has sprung and which is so necessary to our existence? We have touched upon a lot of widely spaced subjects, yet as the next few evenings come to us we shall realize how closely they are

TABLE 6. PERCENTAGES OF HOT AND COLD WATER REQUIRED TO OBTAIN DESIRED TEMPERATURES OF TEMPERED WATER

Degrees Temperature Between Hot and Cold Supply		Percentages of Hot Water Required.																	Drop in Degrees Fahrenheit of Hot Water Used.	
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
5	4 3/4	4 3/4	4 1/2	4 1/4	4	3 3/4	3 1/2	3 1/4	3	2 3/4	2 1/2	2 1/4	2	1 3/4	1 1/2	1 1/4	1	3/4	1 1/2	1 1/4
10	9 1/4	9 1/4	9	8 1/4	8	7 1/4	7	6 3/4	6	5 1/2	5	4 3/4	4	3 3/4	3	2 3/4	2	1 1/2	1 1/2	1 1/4
15	14 1/4	14 1/4	13 1/2	12 3/4	12	11 1/4	10 3/4	9 3/4	9	8 1/4	7 1/2	6 3/4	6	5 1/4	4 1/2	5	4	3	2	1
20	19 1/4	19 1/4	18 1/2	17 1/4	16	15 1/4	14 1/2	13 1/2	12	11	10	9	8	7	6	5	4	3	2	1
25	23 3/4	23 3/4	22 3/4	21 3/4	20	18 3/4	17 3/4	16 3/4	15	13 3/4	12 3/4	11 3/4	10	8 3/4	7 1/2	6 1/4	5	3 3/4	2 1/2	1 1/4
30	28 1/4	28 1/4	27 1/4	25 3/4	24	22 1/4	21 1/4	19 1/4	18	16 1/4	15	13 1/2	12	10 1/4	9	7 3/4	6	4 3/4	3	1 1/2
35	33 1/4	33 1/4	31 3/4	29 3/4	28	26 1/4	24 1/4	22 3/4	21	19 1/4	17 1/4	15 1/4	14	12 1/4	10 3/4	8 3/4	7	5 1/4	3 1/2	1 1/4
40	38	38	36	34	32	30	28	26	24	22	20	18	16	14	12	10	8	6	4	2
45	42 3/4	42 3/4	40 3/4	38 3/4	36	33 3/4	31 3/4	29 3/4	27	24 3/4	22 3/4	20 1/4	18	15 3/4	13 3/4	11 1/4	9	6 3/4	4 1/2	2 1/4
50	47 1/4	47 1/4	45 1/4	43 1/4	40	37 1/4	35	32 3/4	30	27 1/4	25	22 1/4	20	17 1/4	15	12 3/4	10	7 3/4	5 1/2	2 3/4
55	52 1/4	52 1/4	50 1/4	48 1/4	44	41 1/4	38 3/4	35 3/4	33	30 3/4	27 1/4	24 3/4	22	19 1/4	16 1/4	13 3/4	11	8 3/4	5 3/4	2 3/4
60	57	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	3
65	61 3/4	61 3/4	58 1/2	55 1/2	52	48 3/4	45 1/2	42 1/2	39	35 3/4	32 1/2	29 1/2	26	22 3/4	19 1/2	16 1/2	13	9 3/4	6 1/2	3 3/4
70	66 1/4	66 1/4	63 1/4	59 3/4	56 1/2	52 1/2	49	45 1/2	42	38 1/2	35	31 1/2	28	24 3/4	21 1/2	17 1/2	14	10 3/4	7 3/4	3 3/4
75	71 1/4	71 1/4	67 3/4	63 3/4	60	56 1/4	52 1/4	48 3/4	45	41 1/4	37 1/4	33 3/4	30	26 1/4	22 1/2	18 3/4	15	11 3/4	7 3/4	3 3/4
80	76	76	72 1/4	68 1/4	64	60	56	52	48	44	40	36	32	28	24	20	16	12	8	4
85	80 3/4	80 3/4	76 3/4	72 3/4	68 3/4	63 3/4	59 3/4	55 1/4	51	46 3/4	42 3/4	38 3/4	34	30	25 3/4	21 3/4	17	12 3/4	8 3/4	4 1/4
90	85 1/4	85 1/4	81 1/4	77 1/4	72 1/4	67 1/4	63 1/4	58 3/4	54	49 3/4	45 3/4	41 3/4	37 3/4	33 3/4	29 3/4	25 3/4	21 3/4	18 3/4	9 1/2	4 1/2
95	89 3/4	89 3/4	85 3/4	80 3/4	75 3/4	70 3/4	65 3/4	61 3/4	57 3/4	53 3/4	50	46 3/4	42 3/4	38 3/4	34 3/4	30 3/4	26 3/4	22 3/4	10 3/4	5 1/4
100	94 1/4	94 1/4	89 1/4	84 1/4	78 3/4	73 3/4	68 1/4	63 1/4	58 1/4	53 1/4	49 1/4	45 1/4	41 1/4	37 1/4	33 1/4	29 1/4	25 1/4	21 1/4	10 1/4	5 1/4
105	99 3/4	99 3/4	94 3/4	89 3/4	83 3/4	78 3/4	73 3/4	68 1/4	63 1/4	57 3/4	52 3/4	47 3/4	42 3/4	37 3/4	32 3/4	27 3/4	22 3/4	17 3/4	11 3/4	5 3/4
110	104 1/4	104 1/4	99 1/4	93 3/4	88 3/4	82 3/4	77 3/4	71 3/4	66 3/4	60 3/4	55 3/4	50 3/4	45 3/4	40 3/4	35 3/4	30 3/4	25 3/4	20 3/4	12 3/4	6 3/4
115	109 1/4	109 1/4	103 1/4	97 3/4	92 3/4	86 3/4	80 3/4	74 3/4	69 3/4	63 1/4	57 1/4	51 1/4	46 1/4	40 1/4	34 1/4	28 1/4	22 1/4	16 1/4	11 1/4	6 3/4
120	114 1/4	114 1/4	108 1/4	102 3/4	96 3/4	90 3/4	84 3/4	78 3/4	72 3/4	66 3/4	60 3/4	54 3/4	48 3/4	42 3/4	36 3/4	30 3/4	24 3/4	18 3/4	12 3/4	6 3/4
125	118 3/4	118 3/4	112 3/4	106 3/4	100 3/4	93 3/4	87 3/4	81 3/4	75 3/4	69 3/4	62 3/4	56 3/4	50 3/4	44 3/4	38 3/4	32 3/4	26 3/4	20 3/4	14 3/4	7 3/4
130	123 1/4	123 1/4	117 1/4	111 1/4	104 3/4	97 1/4	91 1/4	84 1/4	78 1/4	71 1/4	65 1/4	58 1/4	52 1/4	45 1/4	39 3/4	32 3/4	26 3/4	20 3/4	14 3/4	7 3/4
135	128 1/4	128 1/4	121 3/4	114 3/4	108 1/4	101 1/4	94 1/4	87 3/4	81 3/4	74 3/4	67 3/4	60 3/4	54 3/4	47 3/4	40 3/4	33 3/4	27 3/4	21 3/4	15 3/4	8 3/4
140	133 1/4	133 1/4	126 1/4	119 1/4	112 1/4	105 1/4	98 1/4	91 1/4	84 3/4	77 3/4	70 3/4	63 3/4	56 3/4	49 3/4	42 3/4	35 3/4	28 3/4	21 3/4	14 3/4	8 3/4
145	137 3/4	137 3/4	130 3/4	123 1/4	116 3/4	108 3/4	101 1/4	94 1/4	87 3/4	79 3/4	72 3/4	65 3/4	58 3/4	50 3/4	43 3/4	36 3/4	29 3/4	22 3/4	15 3/4	8 3/4
150	142 1/4	142 1/4	135 1/4	127 3/4	120 1/4	112 3/4	105 1/4	97 1/4	90 3/4	82 3/4	75 3/4	67 3/4	60 3/4	52 3/4	45 3/4	37 3/4	30 3/4	22 3/4	15 3/4	8 3/4
155	146 3/4	146 3/4	139 3/4	131 3/4	124 1/4	116 1/4	108 1/4	100 3/4	93 3/4	85 3/4	77 3/4	69 3/4	62 3/4	54 3/4	46 3/4	38 3/4	31 3/4	23 3/4	15 3/4	8 3/4
160	152 1/4	152 1/4	144 1/4	136 1/4	128 1/4	120 1/4	112 1/4	104 1/4	96 3/4	88 3/4	80 3/4	72 3/4	64 3/4	56 3/4	48 3/4	40 3/4	32 3/4	24 3/4	16 3/4	8 3/4
165	156 3/4	156 3/4	148 1/4	140 1/4	132 1/4	124 1/4	115 3/4	107 1/4	99 3/4	90 3/4	82 1/4	74 1/4	66 3/4	57 3/4	49 3/4	41 3/4	33 3/4	25 3/4	17 3/4	8 3/4
170	161 3/4	161 3/4	153 1/4	144 1/4	136 1/4	128 1/4	119 3/4	110 3/4	102 3/4	93 3/4	85 3/4	76 3/4	68 3/4	59 3/4	51 3/4	42 3/4	34 3/4	26 3/4	17 3/4	8 3/4
175	166 3/4	166 3/4	157 3/4	148 3/4	140 3/4	132 3/4	123 3/4	113 3/4	105 3/4	96 3/4	87 3/4	78 3/4	70 3/4	61 3/4	52 3/4	43 3/4	35 3/4	27 3/4	17 3/4	8 3/4
180	171 3/4	171 3/4	162 3/4	153 3/4	144 3/4	135 3/4	126 3/4	117 3/4	108 3/4	99 3/4	90 3/4	81 3/4	72 3/4	63 3/4	54 3/4	45 3/4	36 3/4	27 3/4	18 3/4	8 3/4

related and how necessary they all are to an understanding of water heating problems.

Shall we now try to answer a few questions? For the correct answers, see Page 68.

### Questions on Chapter 14

1. In what chemical respect are propane and water alike?
2. In what respect does the paradoxical behavior of water at time of freezing interest us in our water heating problems?
3. Define the difference between *suspension* and *solution* in reference to water.
4. What is the difference between water that is temporarily hard and that which is permanently hard?
5. What element is soft water apt to contain in excess?
6. When is a hard water better in a water heater than a soft one?
7. When should brass not be used in a water system?
8. Why should the use of two or more metals be avoided in a hot water system insofar as possible?
9. Name the eight variables which govern the amount of hot water used in a home.
10. A water heater supplies 145° water. The cold water temperature is 40°. How many gallons of hot and cold water must be used to produce 100 gals. of 90° water?

(Chapter 15 of THE BOTTLED GAS MANUAL will appear in the October issue of BUTANE-PROPANE News.)

### H. Emerson Thomas Joins Fisher Governor Organization

H. Emerson Thomas, for many years connected with the Phillips Petroleum Co., Philgas Division, has taken over new duties as a member of the Fisher Governor Co. organization. For the duration of the war, he will act as a consultant for Fisher, as well as serving operators in the liquefied petroleum gas industry.

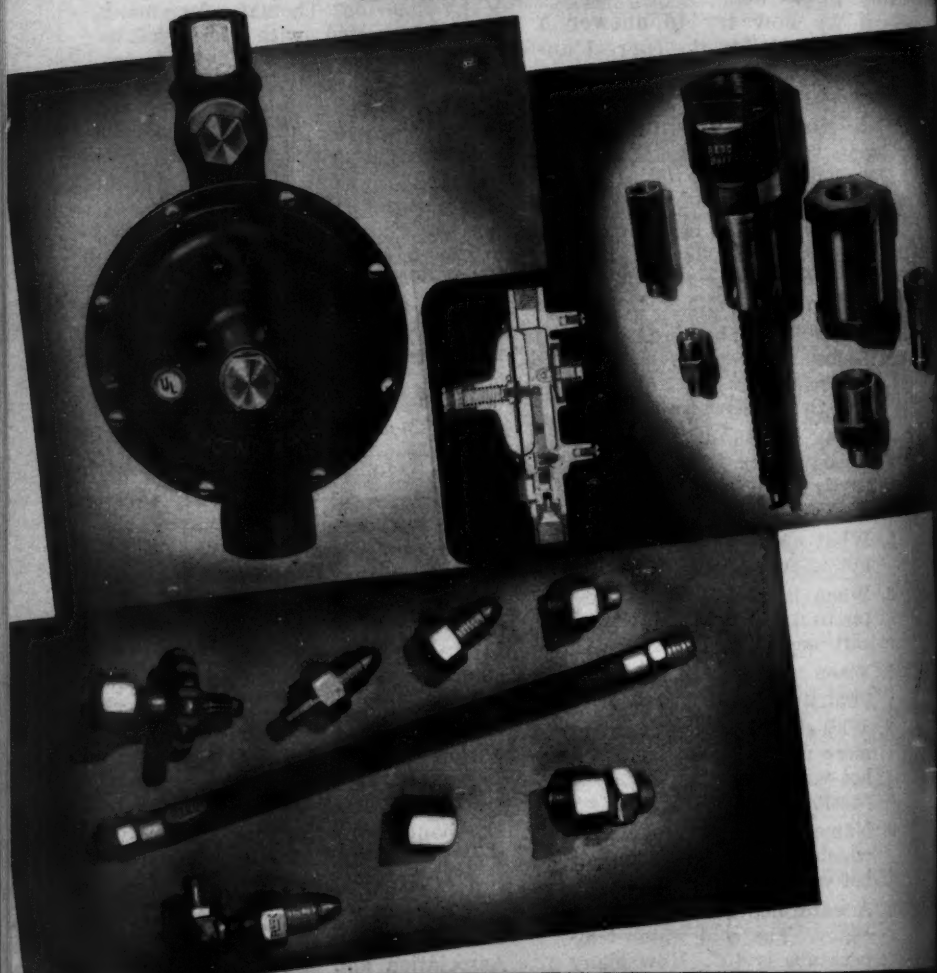


H. E. THOMAS

Mr. Thomas is a native of Akron, N. Y., but spent the most of his early life in Oklahoma, where he gained considerable experience in the oil and gas industry. He received his elementary education in the Oklahoma City schools and later attended the University of Illinois, and Oklahoma City University. He joined the Philgas Department of the Phillips Petroleum Co. in 1929 and was placed in the wholesale division at Detroit, Mich. However, later that same year, he was moved to New York as Eastern representative. In addition, he has handled that company's regulatory work with such groups as Interstate Commerce Commission, Bureau of Explosives, Compressed Gas Mfg. Association, National Fire Protection Association and others.

Mr. Thomas was one of the organizers of the National Bottled Gas Association, now the Liquefied Petroleum Gas Association, and served on its executive board since its inception. He also served two terms as president in 1934 and 1935.

# IMPORTANT



# REGO

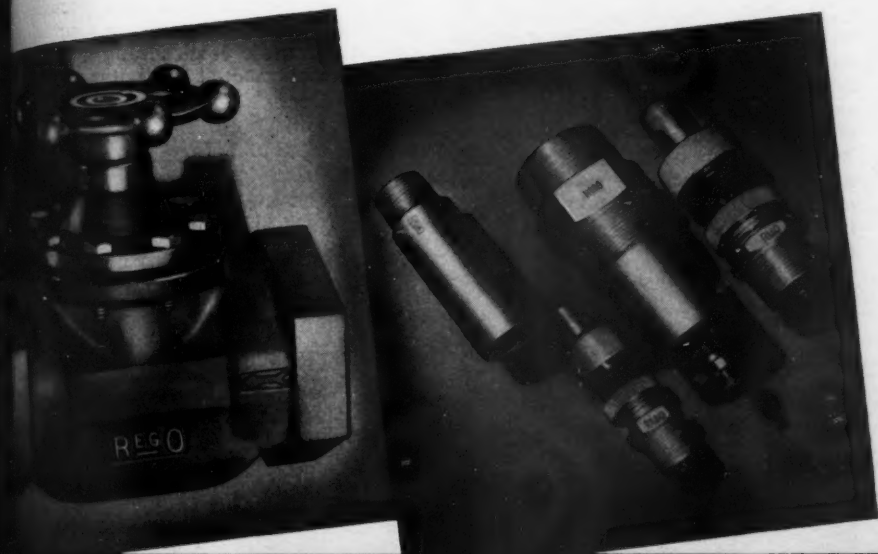
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## Nebraska Residents Find Butane Economical Fuel for Heating

**S**IXTEEN months ago a 1000-gal. butane plant was installed in the city auditorium at Crofton, Neb., by Paul Schreiner, of The Butane Gas Corp., Omaha, Neb., of which Carl A. Anderson is president. City officials of Crofton report that the installation has proven thoroughly satisfactory.

The auditorium, 90x95 ft., consists of a kitchen, city council chamber, and a fire truck room, besides the auditorium itself, on the main floor. There are two large dressing rooms and showers in the basement.

The main auditorium is 75x90 ft., with a 20-ft. ceiling. This room is heated with three 200,000 B.t.u. Humphrey ceiling units controlled by two separate thermostats located in each end of the room. The other rooms are heated with individual heaters, with a throttling type thermostat on the one in the fire truck room. Two regulators on the supply tank insure even temperature.

Another installation of special interest was made in the new home of H. E. Derrick, rancher, whose house is located in the "sand hills" about 30 miles from Basset, Neb. The struc-

ture, with double garage, is 40x95 ft. Mrs. Derrick uses butane for cooking, water heating and refrigeration.

House heating is accomplished with a model D-J Security forced-air butane furnace located in the utility room. All hot air ducts are built into the walls and ceilings and the cold air returns under the floors. There is one specially built concrete duct with an outside opening about 5 ft. deep through which there is a continuous flow of water. The system is designed so that the furnace blower forces the cool, moist air from this duct through the house during the summer months, providing an air conditioning system.

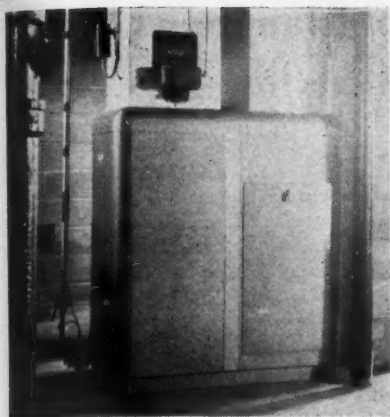
The total amount of butane used by Mr. Derrick for a period of 164 days from Sept. 26, 1941, to March 9, 1942, was 1179 gals. This included fuel for cooking, refrigeration, water heating and heating the entire house with the exception of two bedrooms.

The home of George Welsh, Benson, Neb., was completed last Fall and is heated with a Security Model 9D forced air furnace. The house is 24 x 25 ft., not including the attached garage, has a full basement, and is



▲  
This modest Nebraska farm home, although 30 miles from nearest town, enjoys city comforts through a butane installation.  
▼





Butane furnace in the home of George Welsh, Benson, Neb.

constructed with lap siding over boxing and plaster over insulation board, with storm windows and doors all around. The total amount of butane used from Oct. 1, 1941 to March 11, 1942, a period of 162 days, was 764 gals., with the fuel used for heating, cooking, refrigeration and water heating for a family of four.

F. W. Retz, Omaha, has a home 22 x 28 ft., with no basement; plaster over ½-in. insulation board, with asbestos siding and storm doors and

windows. This house is heated with two wall type furnaces, thermostatically controlled. Butane is also used for cooking and water heating. In the 139 days between last Oct. 23 and March 11, there was used 529 gals. of butane. This family also consisted of four.

In all of these installations, the owners are highly pleased with the operation of the butane systems and with the economy that accompanies their use.



### New Butane Station Opened In Santa Monica, Calif.

Crook Co., Los Angeles, has opened a new butane truck dispensing service at the Corneil Service Station in Santa Maria, Calif. It is located on Highway 101, just south of town and offers 24 hour service.

The owner, who operates the butane station for Crook Co., also maintains a garage and complete truck service facilities.



### Change In Shell Personnel

B. G. Simon, Shell Oil Co., Inc., New York, has been made manager of the lubricants department, replacing J. H. Lee, now an army captain.



The home of F. W. Retz in Omaha uses butane for cooking and water and space heating.



# Third Edition of "Handbook"

## Now Being Distributed

**T**O keep pace with the rapid development of the liquefied petroleum gas industry, the Third Edition of the Handbook BUTANE-PROPANE Gases was released Aug. 1, 1942, by Western Business Papers, Inc., 1709 West 8th St., Los Angeles, Calif. (Price \$5 per copy). This new edition has been completely rewritten, revised and expanded. New chapters have been added, illustrative material has been brought up to date, and tabulated matter has been revised in the light of the most recent experience and generally accepted practice.

New chapters which have been added to the Third Edition, supplementing information published in previous editions of the Handbook, include two introductory chapters—one on the History of the Industry and a second, "The ABC of LP-Gas," which outlines briefly and in simple terms the basic principles of liquefied petroleum gas operation. Other subjects which have been expanded into new chapters include safety practices, liquid metering and pumping, installation and servicing of LP-Gas systems, domestic utilization and commercial utilization.

### Book Has Eight Major Parts

The Third Edition of the Handbook BUTANE-PROPANE Gases is divided into eight major parts which are in turn subdivided into chapters. Part 1 contains the two new introductory chapters. Part 2 is devoted to discussions of the physical and chemical properties of the hydrocarbons; Part 3, the production of liquefied petroleum gases from natural gasoline plants, recycling plants and oil refin-

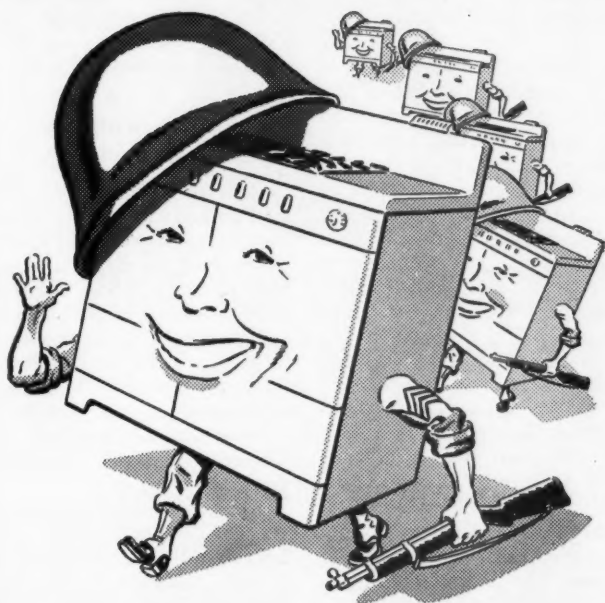
eries; Part 4, transportation by truck, rail, water and pipe line; Part 5, distribution through semi-bulk, bottled gas and central plant facilities; Part 6, utilization in domestic, commercial and industrial applications and as a fuel for internal combustion engines. This part also includes chapters on the comparative performance of liquefied petroleum gas with other fuels and on the uses of liquefied petroleum gas with other fuels and on the uses of liquefied petroleum gases for standby purposes.

### Regulations Are Included

In Part 7 the various Regulations which govern the liquefied petroleum gas industry are outlined. These include N.B.F.U. Pamphlet No. 58, Motor Carrier Tariff No. 7, Freight Tariff No. 4, Unloading from Railroad Tank Cars and Marine Regulations. Part 8, the appendix, carries a discussion of products liability insurance, handy tables for field use, and a bibliography of important published data on the various phases of LP-Gas operation.

In producing the Third Edition of the Handbook BUTANE-PROPANE Gases, the editors called freely upon an Editorial Advisory Board composed of outstanding authorities in the industry. Editorial Board members who contributed both basic material and critical comment are: George A. Burrell, founder and president of the Atlantic States Gas Co., and president of the Burrell Technical Supply Co. and Burrell-Mase Engineering Co., New York; R. M. Conner, director of the American Gas

# WE'RE IN THE ARMY NOW



## All Caloric production is now war production

The Caloric ranges which you would have sold on your floor this Fall and Winter will be leaving for battlefronts instead — in the form of equipment needed by our armed forces. Caloric's entire plant is now required to produce war materials.

However, Caloric research on gas ranges is continuing. And later, when Victory has been

won and we can once more turn to peace-time production, your customers will enjoy Caloric ranges surpassing anything the public now imagines.



**CALORIC GAS STOVE WORKS • PHILADELPHIA, PA.**

SEPTEMBER-1942

Association Testing Laboratories in Cleveland and Los Angeles; Ernest Fannin, president of Fannin's Gas and Equipment Co., Phoenix, Ariz.; Mercer G. Farrar, "Pyrofax" Gas Division, Carbide and Carbon Chemicals Corp., New York; Franklin R. Fetherston, secretary and treasurer since 1927 of both the Liquefied Petroleum Gas Association, Inc., and the Compressed Gas Manufacturers Association, Inc.; Walter H. Hoagland, manager of the Technical Products Department of the Shell Oil Co., Inc., New York; A. N. Kerr, president of the Imperial Gas Co., Los Angeles; J. Woodward Martin, manager of the Stargas Department, Lone Star Gas Co., Dallas, Texas; Ellsworth L. Mills, vice president of The Bastian-Blessing Co., Chicago; H. E. Newell, assistant chief engineer, National Board of Fire Underwriters, New York; G. G. Oberfell, vice president in charge of Research, Special Products and Patents Departments, Phillips Petroleum Co., Bartlesville, Okla.; C. L. Parkhill, vice president, Parkhill-Wade, Los Angeles; D. D. Purrington, Marketing Department, Standard Oil Co. of California, San Francisco; Walter S. Topping, chief inspector, Bureau of Explosives, Association of American Railroads, New York; James W. Vaiden, vice president in charge of manufacturing, Skelly Oil Co., Tulsa, Okla.; H. W. Wickstrom, consulting engineer, Los Angeles; Leon J. Willien, chief engineer for Public Utility Engineering Corp., Chicago; R. R. Wyker, sales manager, Ensign Carburetor Co., Ltd., Huntington Park, Calif.

The volume was arranged and edited by Arthur Rohman, Justus Krappe and J. Brewer Avery.

The First Edition of the Handbook appeared in 1932, the Second Edition in 1935 and a Revised Second Edition was published in 1938. These Editions

were edited by George H. Finley, formerly editor of GAS. During the 10 years from 1932 until the issuance of this Third Edition, 7500 copies of the Handbook have been distributed. The Handbook is recognized as the chief published authority on the subject of liquefied petroleum gases.



### **New A.G.A. Officers Are Nominated**

Arthur F. Bridge, vice-president and general manager, Southern Counties Gas Co., Los Angeles, has been nominated to direct the activities of the American Gas Association next year, according to the recent announcement of the nominating committee which has presented a full slate of Association officers for consideration of the membership prior to the annual meeting in the fall. Those nominated for various other positions are:

Ernest R. Acker, president, Central Hudson Gas & Electric Corp., Poughkeepsie, N. Y., vice president, and J. E. Llewellyn, insurance manager, The Brooklyn Union Gas Co., Brooklyn, N. Y., treasurer.



### **C. F. Pearson Resigns To Enter Service**

C. F. Pearson after 10 years as president, chairman of the board, and general manager of Bottled Gas Ltd. (successor to B. C. Rockgas Ltd.). Vancouver, B. C. has disposed of his stockholding interest and resigned from all offices, effective June 1. Mr. Pearson, who served throughout the last war, has again offered his services.

Harry Sanderson, accountant with the company for the past five years, has subsequently resigned and is now training for a commission with the Paymasters' Corps.



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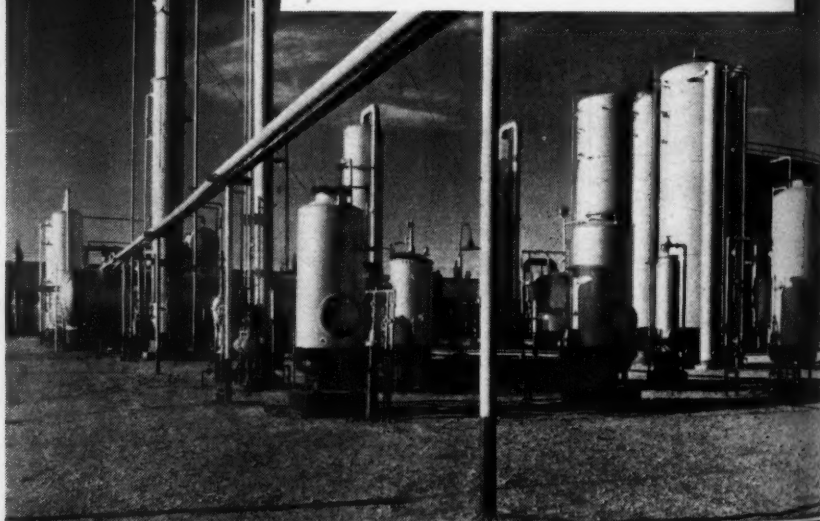
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Thanks to a broad experience and wise foresight in providing the facilities for increased production we have been able, first, to perform our "all out" patriotic duty and, second, to take good care of our regular trade.



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# RESEARCH

EACH MONTH a competent staff reviews more than 70 publications serving the oil, gas and affiliated industries in a search for those published articles of value to technicians and executives in the liquefied petroleum gas industry. In this department of BUTANE-PROPANE News, brief abstracts of such articles are presented.—Editor.

## Neoprene Rubber. *Product Engineering*, May, 1942, pp. 287-289.

One of the so-called synthetic rubbers, neoprene, has the advantage of an accumulation of experience in many widely diversified applications because of its early introduction to industry. Like rubber and other synthetic rubbers, it is produced with a wide range of physical properties, depending upon the kind and amount of compounding ingredients and on its processing. Chemically, neoprene is polymerized chloroprene having the same structure as isoprene, primary constituent of natural rubber, but differing by substitution of a chlorine atom for a methyl group,  $\text{CH}_3$ . In butadiene, basis for Buna rubbers, a hydrogen atom replaces the methyl group in the molecule.

## Butane Requirements Demand Efficient Extraction—R. W. Machen. *Refiner*, May 1942, pp. 143-146.

With the expansion of plants for the production of synthetic rubber ingredients from petroleum and the continuous trend of reformation of butanes into aviation fuels by alkylation, polymerization or other processes, plus diversion of butanes, especially isobutane into other essential defense speciality products, increased efficiency is demanded in the recovery of butanes. Manufacture of natural gasoline by the absorption method is accomplished by three distinct steps. In the absorption plant the rich gas is contacted with oil in absorbers to

remove the constituents desired in the finished products. After the oil has absorbed these constituents, the rich oil is passed successfully through vent tanks, heat exchangers and preheaters to the distillation unit where by a process of distillation the absorbed constituents are driven off by heat under pressure. The absorption oil is cooled by heat exchange and coolers to be recycled through the absorbers while the light constituents absorbed from the gas are liquefied by cooling and accumulated in tanks. Author discusses: The absorption medium; the absorber column; perforated-plate tower; absorber design; mechanics of absorption; factors affecting absorption.

## Facts About Our Rubber Situation

—P. W. Drew, *S. A. E. Journal*, May, 1942, pp. 15-17. What is the truth about the rubber situation? What about Brazilian rubber . . . guayule? How about getting rubber from poinsettias, fig trees, desert shrubs, or various other previously unused sources? In this article the author gives the answers, briefly, crisply. He says: "Every idea developed for the last 20 years in regard to rubber or rubber-like materials has been dusted off and brought out again, but synthetic rubber from petroleum remains our only sound means for replacing the supply cut off by Japan." He explains how and why he reaches this conclusion.

## New Technique Raises Yield of Refinery Raw Materials—J. P. O'Donnell. *Oil and Gas Journal*, May 28, 1942, pp. 34, 35.

Development of a new refining technique in which established processes are capable of producing substantially larger quantities of raw materials for synthetic

rubber and still maintain the capacity production of base stock for 100-octane gasoline was announced by Standard Oil Co. of New Jersey. The new technique may be operated for either of two objectives or for some intermediate goal: (1) Maintenance of existing capacity for 100-octane gasoline production with an increase in the production of synthetic rubber raw materials amounting to 250 to 300 percent, or (2) maintenance of the existing capacity of synthetic rubber raw material production with an increase in the production of 100-octane gasoline of about 15 per cent. The technique involves the simultaneous operation of the Standard developed "fluid catalyst" process in conjunction with the sulfuric acid alkylation process. Under the new procedure, the catalytic cracking operation is carried on for the maximum recovery of butenes.

All butenes recovered are charged to a dehydrogenation unit for the production of butylenes which constitute 98 per cent of butyl rubber or for butadiene which consists 75 to 78 per cent of Buna-S or Buna-N rubber.

**Butane as a Source of Motor Fuel Volatility**—J. W. Vaiden and J. O'Reilly. *Petroleum Engineer*, May, 1942, pp. 116 etc. Increased demand for butane in the manufacture of 100-octane gasoline and synthetic rubber presents problems of providing another source of motor fuel volatility—propane may be the answer.

**Synthetic Rubbers to Meet Requirements of Natural Rubber in Industry**—C. C. Pryor. *Petroleum Engineer*, May, 1942, pp. 127, 128. Qualities and characteristics of synthetic rubber—Butadiene appears to be the most important of synthetic rubber base materials.

**Evaporation from Gasoline Storage Tanks**—C. L. Marnier. *Refiner*, May, 1942, pp. 147-149. A discussion of the problem of evaporation losses from storage tanks and various procedures for minimizing these losses.

**Thermodynamic Properties of Light Hydrocarbons**—D. E. Holcomb and G. G. Brown. *Industrial and Engineering Chemistry*, May, 1942, pp. 590-602. The thermal properties of hydrocarbon mixtures covering the pressure range from 0 to 10,000 lbs. per sq. in. absolute and temperature range from  $-200^{\circ}$  to  $+1100^{\circ}$ F. for vapors and from 0 to  $320^{\circ}$ F. for liquids are presented in graphical form. The reference state for all enthalpies was selected as liquid at zero absolute pressure and  $32^{\circ}$ F. In making heat balance, the enthalpies of liquid and vapor streams are simply added or subtracted after applying any necessary correction for the effect of pressure on the enthalpy of the fluid. The application of these data to commercial high-pressure absorber and fractionator operations indicates that heat balances can be made on such equipment within the accuracy of measuring temperatures, pressures, and flow quantities in commercial equipment.

**Van Nostrand's Scientific Encyclopedia.** A reference work of mathematics, science, engineering, and medicine. Every application of all these subjects to practical life and human knowledge is fully described, including aviation, radio, television, air conditioning, diesel engines—the latest advances in chemistry, physics, civil, mechanical and electrical engineering—botany and zoology, including the human anatomy, its diseases and their most up-to-date treatment. Price, \$10. D. Van Nostrand Co., Inc., 250 Fourth Ave., New York City.

**Three-Way Refinery Developed for War Production**—O. W. Willcox. *World Petroleum*, April, 1942, pp. 26-28. Refining division of OPC standardizing on flexible design capable of producing butadiene for rubber, toluene for munitions, and 100-octane fuel for planes. A simplified flow chart of such a plant is shown.

**Survey of Natural Gasoline Plants in the United States.** *Oil and Gas Journal*, May 14, 1942, pp. 85, etc.

**BUTANE-PROPANE News**

# BANKS TANKS DOMINATE

## Set Your Sights on the Future

By W. W. BANKS



People are writing in asking us what we think of the future of this industry. We would like to go on record, here, and now, in stating that we think the Butane industry has the

imperative to maintain their status. Numerous dealers are also charging for service calls. We heartily indorse this procedure as being entirely sound and profitable. Yes, we believe that now is the time to set your sights on the future!

*Do your part by buying  
all the War Bonds that  
you can!*

greatest possibilities for the future of any new industry.

We say this because we would like to see the dealers maintain their sales position in the market. Butane Systems are selling now; exceptions are being granted. Systems are being supplied to farms, dairies, hospitals, shipyards and other institutions designed for health and our national safety.

We know of dealers who are adding materially to their line of products, keeping uppermost in mind that it is

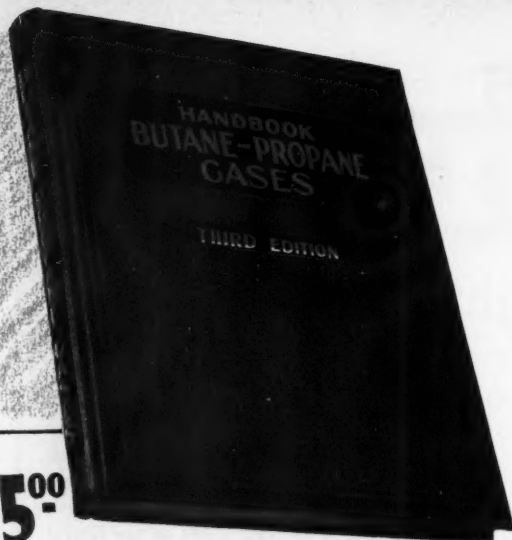


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**ALREADY-ENTIRELY NEW AND  
COMPLETELY REWRITTEN**

## THE BIG 3rd EDITION OF THE HANDBOOK BUTANE PROPANE GASES

Between the covers of this Handbook you'll find the answers . . . TODAY'S Answers . . . to every Butane-Propane question you can ask. It's your primary source of authentic, up-to-date information on all LP-Gas operations. New and completely rewritten, the THIRD Edition of the Handbook continues the basic and needed service, which former editions performed for over ten years, of providing the LP-Gas industry with an authoritative manual on all phases of LP-Gas operation.

Designed for ready-reference use by both the experienced operator and the newcomer to the industry, it is the source to which you will be re-

ferred if you address an inquiry about Butane or Propane gases to the U. S. Bureau of Mines. It is the standard textbook on LP-Gas used by engineering schools in most universities and colleges.

Arthur Rohman, who assisted in the editing of the Revised Second Edition, is editor-in-chief. He is also editor of BUTANE-PROPANE News, and managing editor of G A S, The Natural Gas Magazine.

Justus Krappe, technical editor, was formerly director of Gas Engineering Research at Purdue University and previously with the American Gas Association.

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OF

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*News*

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Reference Book On  
Operating Methods

## J. A. McNaughton Heads Board Of American Liquid Gas Corp.

Recently appointed chairman of the board of the American Liquid Gas Corp., Los Angeles, is J. A. McNaughton, pioneer figure in the Southland's industrial and agricultural development.

Mr. McNaughton is devoting his time to the war-time expansion activities of the company, with particular emphasis on the development of standby and other gas-making unit construction contracts. He was instrumental in securing the firm's contracts with Basic Magnesium, Inc., Bohn Aluminum and Phelps-Dodge.

Arriving in Los Angeles from Chicago in 1923, Mr. McNaughton represented a syndicate which developed the Central Manufacturing District, the Los Angeles Union Stockyards, and the Los Angeles Junction Railway. As president of the stockyards enterprise, he established the only central livestock market in the Southwest. He promulgated many of today's accepted practices for livestock production and marketing.

He organized and was vice president of the Junction Railway, which was established to provide switching service to all railroad trunk lines neutrally.

Because of his widespread contacts in industrial and agricultural circles throughout the Southwest, Mr. McNaughton has been able to interest many of the west's leading war plants, mines, and larger ranchers in butane-propane plant installations.



J. A. McNaughton

## Servel Advertising Office Moved to Evansville, Ind.

The advertising office of Servel, Inc., has been transferred from New York City to the home office at Evansville, Ind., it has been announced by George S. Jones, Jr., vice president and general sales manager of the company. Coincident with this announcement, the appointment of R. J. Canniff as advertising and sales manager, following the resignation of William Reynolds of New York as Servel's advertising director, was revealed.

Mr. Canniff has been sales promotion manager of Servel since August, 1939.



## Geo. D. Roper Corp. Officials Advanced to New Positions

Two men with a number of years background with the Geo. D. Roper Corp. have recently taken over new duties with the company.

Floyd K. Lawson, formerly sales director of the range division, has been elected secretary-treasurer to take the place of T. J. Reynolds, deceased. E. Carl Sorby has been elected vice president in immediate charge of gas range sales. Since gas range production has been stopped as of July 31 Mr. Sorby's work will be closely associated with war production for the duration.



## Louis Ruthenburg Honored For Community Service

In tribute to his "leadership in the industrial activities of Evansville," Louis Ruthenburg, president of Servel, Inc., Evansville, Ind., and president of the Indiana State Chamber of Commerce, has been awarded the Evansville Rotary Club's service award for "outstanding community service during the past year."



## Oklahoma LP-Gas Inspector Urges Care In Truck Parking

James Archer, chief inspector under State Fire Marshal Carl C. Garner, administrator of the Oklahoma liquefied petroleum gas law, recently released a statement to the effect that cities and towns would adopt fewer restrictive ordinances against LP-Gas dealers if butane and propane truck drivers consulted more freely with chiefs of fire departments before parking their trucks in a town.

Mr. Archer called attention to a provision of the Oklahoma LP-Gas regulations which recommends that drivers of butane or propane gas trucks or trailers do not park in any city fire zone, school or hospital zone, except for the purpose of delivering. It also recommends that all such vehicles use parking space designated

by cities having ordinances which specify that such space is provided, and that when any dealer wishes to deliver any liquefied petroleum gas in any city or town he should file with the fire chief or with other proper authority, a detailed report pertaining to his equipment and products.

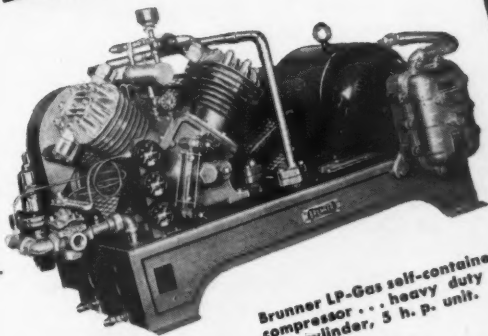
"Some fire chiefs are disturbed if they find an LP-Gas truck parked near a school or hospital or in a crowded downtown street," said Mr. Archer. "LP-Gas is as safe as other liquid fuels but some city and town authorities are not accustomed to it. Then, too, city authorities like to be consulted when out-of-town dealers come to their localities to transact business. If LP-Gas dealers and truck drivers would observe the recommendations referred to, they would create good will and avoid trouble."

## 500 TO 1000 LBS. LP-GAS SAVED Per Tank Car wherever Brunner Units Operate

Liquid Petroleum Gas operators using the Brunner LP-Gas Unit recover 500 to 1000 lbs. of gas from every tank car unloaded. This saving alone quickly pays for the initial cost of the Brunner self-contained unit. And because LP-Gas is a necessity in many defense areas, this gas saving is important as a conservation measure. Brunner Manufacturing Company, Utica, New York, U. S. A.

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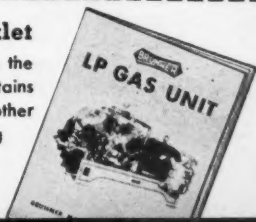
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THE SYMBOL OF QUALITY



Brunner LP-Gas self-contained compressor . . . heavy duty 4 cylinder, 5 h. p. unit.

### Write for FREE Booklet

The new booklet describes the Brunner LP-Gas Unit, contains illustrations, diagrams and other pertinent facts on handling liquid petroleum gas.



## Woodward Martin Back From Washington Post

Woodward Martin, manager of Lone Star Gas Co.'s Stargas Department, Dallas, Texas, returned home July 25, following nearly five months' service as analyst and chief of the Liquefied Petroleum Gas Section of the Natural Gas-Natural Gasoline Division, Office of Petroleum Coordinator, in Washington, D.C.

He was the choice of the liquefied petroleum industry to represent them in their problems and to work with the various governmental departments in showing the important part propane and butane are playing in war promotion, national defense and public welfare. After his recommendation by the industry, and his company's consent to loan him to the government, he received his appointment from Harold L. Ickes, head of the Department of Interior.

During his stay in the nation's capital, Mr. Martin worked with certain branches of the War Production Board, Office of Defense Transportation, and Army and Navy Munitions Board in addition to his duties with the various departments of the Office of Petroleum Coordinator.

## Committee Formed of C.N.G.A. Men Serving War Effort

With a number of its members serving on various government and war committees, the formation of a War Activities Committee, consisting of these men, as a move to coordinate



J. W. MARTIN

the aid which the natural gasoline industry can give the war effort, is announced by the California Natural Gasoline Association.

The committee consists of W. W. Robinson, The Texas Co., and a member of the California Oil Industry Salvage Committee, chairman; William Moeller, Southern California Gas Co.; H. L. Eggleston, Gilmore Oil Co.; P. S. Magruder, General Petroleum Corp.; and R. D. Gibbs. Ex-officio member of the committee is George L. Tyler, C.N.G.A. secretary.

## Hotstream Heater Co. Publishes Pamphlet on War Problems

"Private Business—the Framework of Our Kind of Freedom" is the title of an article recently prepared by I. R. Mendelson, president of The Hotstream Heater Co., Cleveland, Ohio. It is designated as "the first of a series of informative articles on present and post-war problems confronting business and executive management." Those desiring copies may have them by addressing the company.

Mr. Mendelson's closing sentences convey the thought and trend of the entire booklet:

"When this war is ended the first thoughts of our own people will turn to the promises of normal life. By degrees the interests will surge across this pattern we call the framework of democracy . . . a new car, a better refrigerator, an automatic water heater, a modern cook stove and the latest radio. Upon the pleasures and conveniences of these things we, as Americans, rest our case. We want nothing more, for man has not contrived a better guide for our progress.

"Private business—privately owned and privately managed—brought us thus far. No other control can give this ideal continuity."

*... and the next one  
will be even better!*

• We're mighty proud of this LP TAPPAN! But between it and the next one, we're using all of our facilities for Uncle Sam. Meanwhile—skilled men are constantly developing new improvements for that next TAPPAN... a TAPPAN with a host of "extra" conveniences... with more famous TAPPAN "firsts"... with that specialized engineering that boosts liquefied gas sales and customer satisfaction sky high!

**AND MEANWHILE—REMEMBER THE GOOD OLD TAPPAN DAYS!** Keep up your TAPPAN files... remember the abundant TAPPAN sales helps. Use your service manual! Let's keep 'em cooking!

The Tappan Stove Co., Mansfield, O.

**TAPPAN**  
Gas Ranges



**THE MOST HONORED UNIT HEATERS ARE**

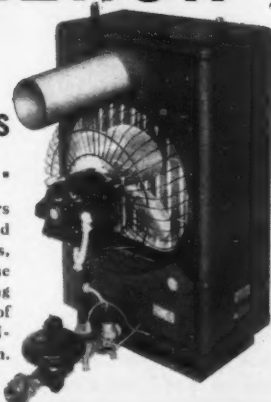
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**Selected for 165 Training Stations  
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The circumstances surrounding the selection of Reznor Unit Heaters for 165 camps are important. Groups of able engineers, architects, and contractors in charge of construction of various Army and Navy stations, selected the make of heaters they preferred for their own projects. The decisions were supported by their broad experience and technical heating education. The selections of Reznor Gas Unit Heaters assure them of dependable OPERATION, broad HEAT DISTRIBUTION, and INSTALLATION SAVINGS. Write today about your heating problem.

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**"GAS HEATERS EXCLUSIVELY SINCE 1888"**

# Oil Operators

## Like Butane

**D**OMESTIC and oil field demand for butane gas in Oklahoma is holding up to the standards of last year for the White Way Butane Gas Co., of Oklahoma City, according to Paul C. Took, manager and owner of the company.

With no war industries or camps on his routes, Mr. Took stated that for the 12-month period ending June 30 this year he sold and delivered approximately 900,000 gals. of butane with his five delivery trucks and one transport operating in Oklahoma as far as the Kansas-Oklahoma line near Alva and the Oklahoma-Arkansas state line near Stillwell.

The Oklahoma oil fields are helping to keep up the demand for this fuel. Mr. Took reports that his company for several months has been furnishing butane for oil well drilling purposes in the Lucien field west of Perry, Okla. He is now supplying the fuel at the rate of about 10,000 gals. per month to the Big Chief Drilling Co., of Oklahoma City, for an oil well being drilled in the Lucien area. Some of the wells in that area are using butane not only for drilling but for operating production equipment, in preference to natural gas for which other markets can be found.

The White Way Butane Gas Co. has all of its delivery and transport trucks operating on butane gas. They are equipped with Ensign convertible carburetors and vaporizers furnished through The Binkley Co., of Oklahoma City, Oklahoma distributors for Ensign butane carburetion equipment. These carburetors permit switching to gasoline for fuel in cases of emergency.

The White Way Butane Gas Co.

has operated its trucks on butane since 1939. Mr. Took states that his average fuel costs for butane are about the same as they would be for gasoline but that he has accomplished substantial savings on oil consumption and maintenance.

As an example of the continued domestic demand for butane Mr. Took says that he has 300 such customers in and near Alva, northwestern Oklahoma, where there is no wood for fuel and coal is scarce and may be harder to get this winter. He maintains storage tanks at Alva with 3700 gal. total capacity. His company also has storage tanks at Stillwell in extreme eastern Oklahoma with 3400 gal. total capacity.

### Synthetic Rubber Plants To Cost \$90,000,000

After visiting the site of the new plant of Rubber Synthetics, Inc., located at Gary, Ind., President William B. Plummer said an investment of \$90,000,000 will be made in facilities for making all components of synthetic rubber and for polymerizing them on the ground.

This estimate is in contrast with many and varied earlier estimates of expenditure and represents the first announcement of a total cost following the recent publicity given the subject and based upon farm-bloc efforts to force the production of rubber from grain alcohol.

The attitude of the petroleum industry has been consistently to make the rubber substitutes from whatever hydrocarbons are quickly and adequately available and which processing caused the consumption of the least vital war materials.

The announcement of the cost estimate by Dr. Plummer indicates that construction and operating items have been completed in greater detail than the recent discussions suggested.



WHEN THE SQUALL COMES—  
YOU'LL BE GLAD YOU USE

*Anchorgas*

In every emergency you can depend on this high quality Butane and Propane to see you through.

A prompt, friendly service. Your inquiry will be appreciated.

The economical fuels, Butane and Propane, for industrial and domestic use.



**ANCHOR**  
PETROLEUM COMPANY  
Atlas Life Bldg. Tulsa, Okla.

## Our ABC for VICTORY!

### Assured Blodgett Cooperation

War Department orders currently require 100% of our production capacity.

And so, to present Blodgett Oven owners, we pledge our full cooperation to "Keep 'Em Cooking" until such time as we can again meet your requirements for new ovens.

Send us the number or numbers of your Blodgett equipment. We will promptly send you a sheet listing all repair parts, an instruction-card and operating instructions.



**THE G. S. BLODGETT CO., INC.**

53 MAPLE STREET

BURLINGTON, VERMONT

## ***Hoist Simplifies Cylinder Handling***

**T**HE problem of surface storage for cylinders that offers greatest handling convenience and maximum protection against fire has been solved to the satisfaction of A. N. Kerr, president of the Imperial Gas Co., Los Angeles, by Durwood Hutchinson, in charge of central California deliveries of "Rockgas," the company product.

Mr. Kerr objects to wooden platforms because of their initial and repair costs, fire hazard and tendency to decay. So he mentioned it to Mr. Hutchinson, who conceived the idea of installing an automatic hoist similar to those used on automobile grease racks. One was purchased for \$245 and was operating successfully the next time Mr. Kerr visited the Los Altos plant, Mr. Hutchinson's headquarters.

Propane gas pressure actuates the

oil in the hoist, which can be raised to the level of the truck bed and then lowered to the level of the ground or the low, cement pad that surrounds the six filling scales, eliminating the usual hazards of handling and at the same time speeding up loading and unloading operations.

### **Nine Plants Have Compressors**

The Los Altos plant has a 4 x 4 compressor and fills cylinders by means of the differential method. Similar methods are now used at nine other Rockgas filling stations.

The cylinders shown in the accompanying picture are of 210 lb. capacity. The platform is large enough to hold an auto. In the distance may be seen the Rockgas "semi" with portable filling plant and two 1350-gal. spherical tanks. The tractor, a 3-ton truck, is fitted with a truck body. At times the truck delivers propane in bulk in the spherical tanks and at other times it delivers cylinders to distributors.



Los Altos, Calif., filling plant of Imperial Gas Co., showing automatic hoist for cylinders.



**THE QUALITY OF  
PAYNEHEAT EQUIPMENT  
IS STANDING USERS  
IN GOOD STEAD TODAY!**



**CONSULT ALGAS**

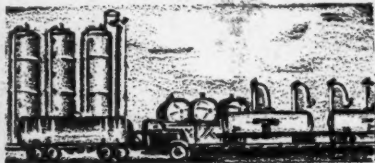


**For Your  
"GASAIR" Gas Making Unit**

Algas engineers are designing specialized butane-propane plant installations for scores of war production plants, using "GASAIR" vaporizers and mixing apparatus. Investigate how these entirely automatic plants, operating without outside power and requiring no buildings or holders, can solve your gas problem.

Recent Algas installations include Douglas Aircraft, Phelps-Dodge, Continental Can Corp., many government cantonments.

**AMERICAN** LIQUID GAS CORPORATION ★  
LOS ANGELES CHICAGO



## SMITH PUMPS

*Speed*  
**LP-GAS TRANSFER**

Fast, safe transfer of butane and propane from tank cars to storage or tank trucks is important to you. SMITH Butane-Propane PUMPS, especially designed for this difficult service, eliminate hazardous gas leaks and costly shutdowns. Write for full details.

**SMITH Precision Products COMPANY**  
1135 MISSION ST. SOUTH PASADENA, CALIF.

Order These Famous L. P. Gas  
Products From Us . . . .



*The* **BASTIAN-BLESSING Co.**

**THE DAYTON-DOWD CO.**

**Hackney**  
BUTANE PROPANE CYLINDERS

**L.C. RONEY INC.**

**The IMPERIAL  
BRASS MFG. CO.**

**GAS EQUIPMENT CO., INC.**  
2620 South Ervay Street, Dallas, Texas  
**GAS EQUIPMENT SUPPLY CO.**



W. W. Banks at the controls of ground leveling bulldozer.

### Installing Traveling Cranes For Dallas Tank & Welding Co.

In order to save steel for war purposes the Dallas Tank & Welding Co., Dallas, Texas, purchased a used building in good condition at Marietta, Ga., and is erecting it on the newly acquired property adjoining the present plant.

The structure will be equipped with both a 5-ton and a 10-ton electric operated, overhead, traveling crane. The foundation is of 5-in. concrete. An underground testing pit will be used now for testing army and navy equipment. Later it will be used to test LP-Gas equipment. It is expected that the building will be completed by approximately Sept. 1. A 7-ft. wire mesh fence will be constructed around the new property.

Shown in the accompanying picture is W. W. Banks, president of the company, operating a bulldozer leveling ground preparatory to building construction.

# FOR MORE SATISFIED CUSTOMERS

For a More Dependable Source of Supply—A Stable and More Uniform Fuel—A Higher Quality Product—Look into the advantages of Carter Propane and Butane.

Write today for complete information. Address: The Carter Oil Company, Marketing Department, Room 928, National Bank of Tulsa Building, Tulsa, Oklahoma.

## DEHYDRATED *Propane and Butane* **THE CARTER OIL COMPANY**

TULSA, OKLAHOMA

Shipping Points: Seminole, Okla., Stonewall, Okla., St. Elmo, Ill.

WHOLESALE ONLY!

## DO YOUR PART

It's up to you to maintain all L.P.G. regulators now in use. They **MUST** last, and provide unfailing service. To help in this program, Fisher Governor Company offers these two services, plus a new service manual that will be gladly sent to you without cost. Write today.

### COMPLETE RECONDITIONING SERVICE

Send your old regulators to us. We will replace worn or broken parts, test for leaks and pressure setting, and send them back to you as good as new.

### REPAIR PARTS SERVICE

Replacement parts for all Fisher L.P.G. regulators, no matter how old, can be supplied promptly. Parts catalogs, including prices, are available on request.

# FISHER

**GOVERNOR COMPANY.**  
940 Fisher Building  
MARSHALLTOWN, IOWA

SEPTEMBER 1942

## **Pacific-Airmax Corp. Formed by Merger**

Helen A. Hartfield, president of Pacific Gas Radiator Co., Huntington, Park, Calif., and R. C. Gross, president of Airmax Corp., San Diego, have announced the merger of their companies under the new firm name of Pacific-Airmax Corp.

"The merger was effected primarily to facilitate and extend the participation of both of the merging organizations in the way of war effort," said Mrs. Hartfield, who continues as chairman and president of the corporation.

All Airmax products will now be manufactured in the fully equipped metal working plant and foundry of the Pacific Gas Radiator Co. at Huntington Park, established more than 29 years ago for the manufacture of residential, commercial and industrial gas heating and ventilating equipment. General offices will be there also. The arrangement makes it possible to enlarge and speed the production of the essential airplane heating and comfortizing equipment by the Airmax Corp. and the war work already under contract at the Pacific Gas Radiator Co.

R. C. Gross, president of Airmax Corp. has been appointed vice president and general manager of Pacific-Airmax Corp. and A. A. Arnheim, also of Airmax, will be chief engineer. Other officers are Helen C. Wilke, secretary and treasurer; L. M. Hull, sales manager; E. M. Rahm, works manager, and J. B. Marchand, purchasing agent.

"By uniting the executive and technical personnel of both companies, the new organization is fully staffed for the important war effort in which it is now engaged as well as planning for the resumption of normal manufacturing after victory is won," fur-

ther stated Mrs. Hartfield. "Like most other manufacturing plants, we are now engaged entirely in war work, but plans are already under way for complete redesigning and improvement of the entire line of Pacific residential, commercial and industrial gas heating equipment for peace time uses and addition of new products."



## **Clinton Owsley Heads Texas Railroad Commission**

Clinton Owsley has succeeded Dr. F. V. L. Patten as chief of the oil and gas division of the Texas Railroad Commission. Mr. Owsley has been the commission's director of production. Mr. Patten left Aug. 1 to become assistant director of the division of reserves of the Office of Petroleum Co-ordinator.

J. K. Baumel, chief enforcement officer will succeed Mr. Owsley as director of production.

H. C. Crawford, senior engineer, and Elmer Pattman, examiner, will be moved up in the commission organization, but their positions have not been assigned as yet.



## **A.G.A. Publications List For 1942 Now Available**

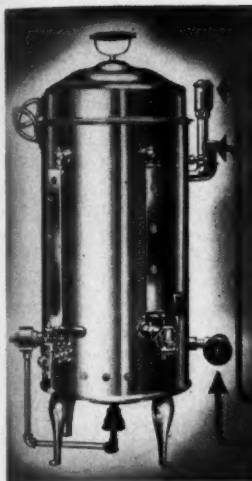
The American Gas Association, 420 Lexington Ave., New York, N. Y., has issued the 1942 List of Publications. Alphabetical order of divisions in the list are as follows:

Accident Prevention Accounting Section; General; Industrial and Commercial Gas Section; Natural Gas Section; Rates; Industrial Gas Research; Residential Section; Statistical; Technical Section; and Testing Laboratories.

Subdivisions under the headings of Requirements, Directories, and Reprints of Articles and Bulletins complete the list.

# Keep 'Em Brewing!

HELP YOUR CUSTOMERS CONSERVE THEIR COFFEE URNS



• With production of coffee urns strictly curtailed, you can build good will by showing your customers how to preserve their present equipment. Blickman urns are built for long life and maximum efficiency. Observance of simple precautions will assure your customers of trouble-free operation during the emergency.

## OPEN WATER INLET VALVE VERY SLOWLY

Avoid quick temperature changes when adding water to the boiler of an urn battery or combination urn. Open water supply valve slowly. Otherwise, sudden inrush of fresh cold water will cause rapid condensation of steam. This creates partial vacuum and outside atmospheric pressure may collapse boiler.

## DON'T OBSTRUCT SAFETY and VACUUM VALVES

Never place anything on safety and vacuum valves. Safety valves are designed to release at certain pressures. Obstructions may create excessive pressures. If vacuum valve is blocked, air is prevented from entering boiler and vacuum may result even when cold water is admitted slowly. This may cause boiler to collapse.

SAFETY and  
VACUUM VALVE  
WATER INLET  
VALVE

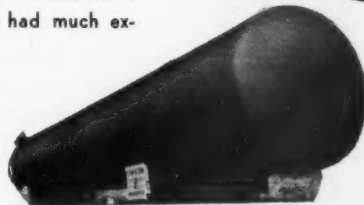
**S. BLICKMAN, INC.**

Manufacturers of Food Service Equipment  
2109 Gregory Ave. • WEEHAWKEN, N. J.

• Consider the specialized knowledge that must enter into the design and construction of tanks for propane storage . . . And, how much you must depend on the fabricator for specifications for materials and choice of procedure for handling them.

That is why it's wise to choose a fabricator who has had much experience in this field — and why Downingtown so often is given the job.

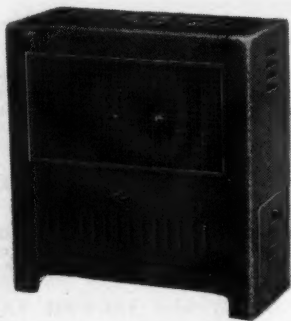
## Why



?

FOR PROPANE TANKS FOR UNDERGROUND OR ABOVE-GROUND STORAGE

## L-P CIRCULATORS



Write today for Catalog and prices of the  
BRILLIANT FIRE line of High Efficiency  
Gas Circulating Heaters.

**The OHIO FOUNDRY  
& MANUFACTURING CO.**  
Steubenville, Ohio

**Pacific Coast Distributors for  
Bastian-Blessing L.P.G. Equip-  
ment • Dayton Dowd Pump Co.  
International Distributors for  
Day & Night I.C.C. Cylinders  
Manufacturers of  
Vapor Differential Compres-  
sors; Roney Valves & Fittings**

**LARGEST AND MOST EXPERIENCED  
MANUFACTURING ENGINEERS AND  
JOBBER OF L. P. G. EQUIPMENT**

**Whatever the Need  
Whatever the Problem  
"WRITE RONEY"**

**L.C. RONEY INC.**  
1740 44th ST. - LOS ANGELES, CALIF.

## Alan P. Tappan Commissioned As Captain In Air Service

Alan P. Tappan, vice president, The Tappan Stove Co., Mansfield, Ohio, has taken leave from his company and has been commissioned a captain, A.A.F., Air Service Command, Wright Field, Dayton.



**A. P. TAPPAN**

After leaving Cornell University, Captain Tappan enlisted in Company M, 8th Ohio Inf. which was later active on the Mexican border; appointed second lieutenant

after attending officers training school at Ft. Benj. Harrison; in 1918 was transferred to Air Corps, served as flying instructor in Texas and California, and was promoted to Officer in Charge of Flying with 312th Squadron at Bolling Field.

After World War I he was commissioned captain, specialist-reserve, and at Mansfield served as officer in charge of reserve officers training.

Captain Tappan has been active for many years in the Tappan organization, and served as chairman of a number of committees of the American Gas Association and Association of Gas Appliance & Equipment Manufacturers.

## Arkansas Gasoline Plants Increase Daily Production

Daily average production of the nine gasoline plants in southern Arkansas during June was 2234 bbl. of gasoline, 463 bbl. of butane and 11 bbl. of distillate, according to the monthly statistical bulletin of the Arkansas Oil and Gas Commission just released.



"KEEP 'EM FRYING!"  
USE **PITCO**

**Fryalators**  
REG. U.S. PAT. OFFICE

SAVE FAT . . . GAS . . . SPACE

**Deep-Fat Frying at Its Best**

- ★ Customers can serve a wider variety of fried foods.
- ★ Left-overs or by-products quickly converted into daily specials.
- ★ Increase in customer business means increase in the gas load.
- ★ Actual saving in fat alone more than pays total cost of gas required to operate them.

Send for 1942 Illustrated Catalog.

**J. C. PITMAN & SONS,**  
INCORPORATED

711-719 Broad St.

Lynn, Mass.

"ORDER" NOW



No. 6475 radiant heater, 5 double radiant 20,000 BTU.

Under L-79 (revised) and L-86 your regular customers can purchase NECESSARY Peerless L. P. Gas Heaters, and we can ship our dealers heating equipment from present stocks for these customers. Order at once to assure delivery.

**PEERLESS**

MANUFACTURING  
CORPORATION  
INC.

LOUISVILLE, KENTUCKY

*Comfortization*



**TO STEP UP PERFORMANCE WHEREVER  
PHYSICAL LIMITS ARE STRAINED!**

*I*N THE AIR, in the factory, in the home—wherever the Fight for Freedom imposes new and greater limits on human performance—there PACIFIC-AIRMAX heating and conditioning equipment does its vital, timely job of increasing human efficiency through greater comfort.

PACIFIC-AIRMAX CORPORATION—formed through the merger of AIRMAX CORPORATION of San Diego, California, with PACIFIC GAS RADIATOR COMPANY of Huntington Park, California—now combines in one fully staffed and equipped plant complete facilities for the production of special high-altitude heating and comfortizing equipment for aircraft and a complete line of PACIFIC-AIRMAX gas heating and ventilating equipment for America's factories, training stations, cantonments and defense homes.

PACIFIC-AIRMAX engineers are developing and applying advanced design principles to wartime heating equipment that will be reflected in a new, still better and more saleable line of PACIFIC-AIRMAX equipment for peace-time uses after Victory is won.



## Sells Fuel Only, So Business Shows No Slack Due to War

Selling fuel only, Howard's Butane Gas Co., of Seiling and Woodward, Okla., has not been materially affected by the Government war orders limiting expansion of the LP-Gas industry.

The firm sells to no consumers, instead supplying dealers in Northwestern Oklahoma with refilled cylinders and bulk quantities of butane. Customers of such dealers who have large supply tanks, such as farmers and commercial users, are served direct to avoid double handling and because many dealers do not have delivery facilities, but the dealers do the billing and collecting.

Altogether, Howard's Butane Gas



MRS. CUPPERNOLL

Co. has about 350 dealer accounts on its books. It has never handled appliances or equipment and thus is not in a competitive position with dealers.

The company was organized by Howard Cuppernoll, who directed it until he was accidentally killed last Sept. 29. Since then Mrs. Cuppernoll has been managing operations, but when her son, Lawrence, 18 years of age, was drowned on June 26, she decided to make a trip to California to gain a temporary change of scene. Accompanied by her mother, and driven by one of her employees, H. R. Saunders, she spent several weeks in July and August in the Los Angeles area. While there she purchased a Smith Precision Products Co. pump for one of her delivery trucks, taking it back with her. It will be installed on a 1400-gal. capacity tank truck which also carries a Smith Meter Co. meter.

A second tank truck, of 1585-gal. capacity, has a Roper pump and a Pittsburgh Equitable Meter Co. meter. (Photos of these trucks below.)

Mrs. Cuppernoll has two bulk



The two delivery tank trucks of the Howard Butane Gas Co. which supply butane to dealers in northwestern Oklahoma. Lawrence Cuppernoll, recently drowned, is shown as the driver of the truck on the right.

# AMERICAN

## Efficient

### BUTANE AND PROPANE TANKS

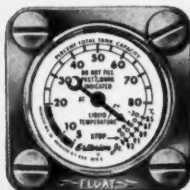
#### AMERICAN

PIPE & STEEL CORPORATION

Manufacturers and Distributors

ALHAMBRA

CALIFORNIA



### LONG WILL THEY SERVE!

... that's because Rochester Geuges are carefully designed and durably built to serve with greater accuracy and dependability throughout the present emergency.

ROCHESTER MFG. CO., INC.  
17 Rockwood St., Rochester, N. Y.

## ROCHESTER

*Criterion* GAUGES

SEPTEMBER-1942

## NEWS THAT GETS AROUND



Every one of those good Florence L-P Gas Ranges you've sold to thousands of lucky American families is busy these days . . . turning out good wholesome meals day after day . . . turning them out easily and promptly . . . using valuable L-P Gas thriftily!

Every Florence you've ever sold is working for *you*, too. Women like to cook with a Florence, and that liking is extended to your service and your fuel. That's news that gets around!

Florence is all-out for Victory today . . . but we pledge you even better, finer L-P Gas Ranges when that job is done!



Florence's capital, men, management and resources—a \$30,000,000 production capacity!—are rapidly being converted entirely to important war work!

## FLORENCE GAS RANGES

### For L-P Gas

BACKED BY 70 YEARS' EXPERIENCE

FLORENCE STOVE COMPANY  
Gardner, Mass.; Kankakee, Ill.; 1458-59  
Merchandise Mart, Chicago; 45 E. 17th St.,  
New York; 53 Alabama St., S.W., Atlanta;  
301 N. Market Street, Dallas.

**IN TEXAS IT'S**

**THE BUTANE COMPANY**

*for*

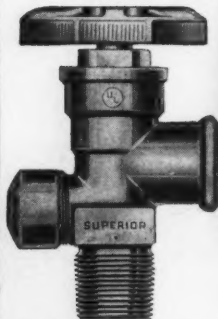
**WHOLESALE DELIVERIES  
DIRECT TO YOUR BULK  
STORAGE PLANT.**

**the BUTANE Company**

• BROWNWOOD, TEXAS

WHOLESALE TRANSPORTERS—DISTRIBUTORS OF BUTANE

### *Superior* LP-GAS CYLINDER VALVES



Listed as  
Standard  
and for  
Re-examination Service  
By  
Underwriters'  
Laboratories



Write for  
Bulletin LP-8  
For details on

cylinder valves; and valves and accessories  
for bulk stations; above and below ground  
installations.

**SUPERIOR VALVE & FITTINGS CO**  
1509 WEST LIBERTY AVENUE  
PITTSBURGH, PENNSYLVANIA

plants, one at Seiling built by the Dallas Tank & Welding Co., of Dallas, and the other at Woodward which was manufactured by McNamar Boiler & Tank Co., of Tulsa. The home office is located in Seiling.

### **LP-Gas Production Declines in Texas**

Production of natural gasoline and liquefied petroleum gases in Texas declined to 2,472,120 gal. daily (58,800 bbl.) during April, a reduction of nearly 20% from the year's high peak of 3,034,759 gal., registered in February. The reduction of 562,639 gal. in production of liquid products by natural gasoline manufacturers in Texas between February and April came in two nearly equal declines. Production dropped 275,956 gal. daily in March and another 286,683 gal. per day in April.

Natural gasoline plants produced 502,916 gal. of butane daily in April, nearly 35% under the output of 766,822 gal. daily in February. The decline in natural gasoline production was more moderate, falling less than 10% from a daily average of 2,267,307 gal. daily in February to 1,969,304 gal. in April.

### **C. J. Bender Takes Over Agency For Roadmaster Products**

C. J. Bender, Automatic Gas Equipment Co., of Dallas, Texas, has been appointed Northeast Texas distributor for Roadmaster Products Co., of Los Angeles, Calif.

The Roadmaster line includes Roadmaster butane carburetors and Teko fire extinguishers. Sales and service of the equipment will be maintained by Automatic Gas Equipment Co. at its Dallas headquarters.

Stanley Bent, Southwest representative of Roadmaster Products Co., makes his headquarters in Dallas.

*For Safety  
and Economy*

## ETHYL MERCAPTAN

—Purified—

The ACCEPTED  
standard  
odorant  
for liquefied  
petroleum  
gases.

**MALLINCKRODT  
CHEMICAL WORKS**

ST. LOUIS

NEW YORK

## McNAMAR *Tanks*

- TRUCK TANKS
- TRANSPORTS
- SKID TANKS
- STORAGE TANKS
- UNDERGROUND  
SYSTEMS

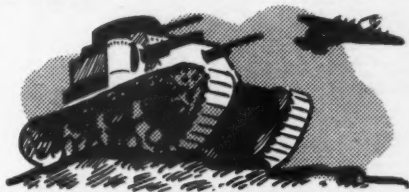
All tanks ASME U-69, inspected by  
Ocean Accident & Guarantee Corp., Ltd.

**McNAMAR**  
BOILER AND TANK COMPANY

Tulsa, Oklahoma

Salem, Illinois

## FOR HOME FRONT



## OR BATTLE FRONT



## Use SINCLAIR L-P GAS

Our plants and products are dedicated to the successful prosecution of the war. Our distributors tell us that most of their Sinclair Butane and Propane is going into our national war program—in defense workers' homes, in war industries, shipyards, power plants, chemical works and refineries.

Yes, whether they are converted into synthetic rubber, aviation gasoline, power, fuel or light, Sinclair Butane and Propane are vital materials. You can't find a better source of supply or a better quality of LP-Gas than Sinclair.

*Protect your fuel requirements  
by contracting with*

**SINCLAIR PRAIRIE  
OIL COMPANY**

Liquefied Petroleum Gas Division  
Sinclair Building Tulsa, Oklahoma

# ANSWERS

## To Chapter 14 The Bottled Gas Manual

Here are the answers to the questions on Page 35 and which refer to problems in Chapter 14 of THE BOTTLED GAS MANUAL:

1. They both contain hydrogen.
2. We must be sure that all pipes and tanks are protected from temperatures below 32°F. so that they will not burst as expansion occurs due to freezing.
3. Matter held in suspension does not change its chemical characteristics and may easily be removed by a suitable filter. Matter held in solution enters into a chemical combination and changes both its physical and chemical characteristics.
4. Temporarily hard water may be softened by boiling, thereby removing the hardening compounds. Permanently hard water may not be softened in this manner.
5. Free or dissolved oxygen.
6. When it deposits a thin protective coating on the interior of pipes and tanks.
7. When the water is of an acid nature.
8. Because of the possibility of electrolytic action.
9. A. The climate.  
B. Personal habits of inmates in reference to cleanliness and sanitation.  
C. The occupation of the inmates.

- D. The social habits of the inmates.
- E. The presence of children.
- F. The presence of servants.
- G. The presence of paying inmates.
- H. Illness in the home.

10. What we really wish to do is raise the temperature of 100 gals. of water from 40° to 90°.

90-40=50° desired temperature rise.

$$\text{B.t.u. required} = 100 \times 8\frac{1}{3} \times 50 = 41666\frac{2}{3}.$$

By cooling 1 gal. of 145° water to 40° we can acquire:  
 $1 \times 8\frac{1}{3} \times (145 - 40) = 875$  B.t.u.

To get 41666 $\frac{2}{3}$  B.t.u. by this process we would have to

$$\text{cool } \frac{41666.67}{875} = 47.619 \text{ gals. of } 145^\circ \text{ water to } 40^\circ.$$

We would therefore need 47.619 gals. of 145° water and

52.381 gals. of 40° water to get

100.00 gals. of 90° water.

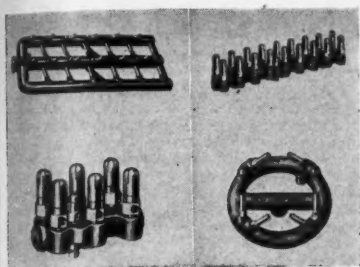


## George H. McFadden Elected President of Ohio Foundry

At a recent stockholders meeting of The Ohio Foundry & Manufacturing Co., of Steubenville, Ohio, pioneer heater manufacturer, George H. McFadden was elected president. W. L. Sharpe, retiring president, becomes chairman of the board. Mr. McFadden, a grandson of the founder, has served on the sales staff, as factory superintendent, treasurer and manager.

Other officers elected are H. C. Zies, vice president and secretary, and C. P. McFadden, treasurer.





## BARBER Appliance Burners

We make many types of Burner Units to fit a wide range of gas appliances. Nearly 200 appliance makers use Barber Burners. All Barber units correctly designed and equipped with proper jets to suit the appliance. Barber is the ONE burner which assures complete combustion on Butane-Propane or ANY OTHER gas. Appliance builders and fuel distributors give their customers better service, more economy, by advising the use of Barber-equipped appliances. Submit your burner problems to us. Complete new Catalog on request.

**THE BARBER GAS BURNER CO.**  
3704 Superior Ave. Cleveland, Ohio

## SPRAGUE METERS

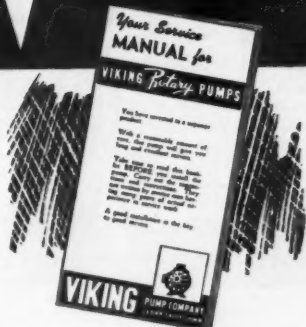
for

PROPANE - BUTANE SERVICE

*Write for Particulars*

## SPRAGUE METER COMPANY

Bridgeport, Conn.  
Los Angeles, Calif.  
San Francisco, Calif.



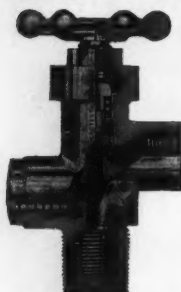
Viking offers you help with your war-time rotary pump problems through Viking Service Manual. It's a handy illustrated booklet that tells you how to get utmost performance out of Viking Rotary Pumps. It is offered to you FREE. Your request for a copy will be filled by return mail.

WHEN ORDERING PUMPS OR PARTS, PLEASE GIVE US YOUR PRIORITY RATING AND ALLOCATION SYMBOL. Be sure to obtain the highest rating possible. Check up to see if recent priority changes have improved your rating.



**VIKING PUMP  
COMPANY**  
CEDAR FALLS, IOWA

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**KEROTEST**  
PROPANE-BUTANE  
CYLINDER  
VALVE

For controlling Propane-Butane gases accurately, depend on the Kerotest Propane-Butane Cylinder Valve. It's safe and extra-durable.

Write for Catalog.

**KEROTEST**

KEROTEST MANUFACTURING COMPANY  
PITTSBURGH PA

# DEARBORN GAS HEATERS

The Quality Line with Outstanding

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REVOLUTIONARY SAFETY FEATURE
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- BLUE FLAME PILOT  
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## HELP WANTED

WE HAVE AN OPENING FOR A MAN TO take care of Operation covering several divisions in Eastern Pennsylvania, handling a retail and wholesale Operation. One who has had experience contacting dealers as well as domestic distribution. Consideration given to answers with full details, last employment and compensation expected. Reply Postoffice Box 1012, Philadelphia, Penna.

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WANTED—THE FOLLOWING EQUIPMENT: Two Butane transports, 3,000 or 4,000 gallon capacity; must be of approved type. Also 250,000 gal. Butane storage. State location and price. Write P. O. Box 73, Woodworth, La.

WANTED—PROPANE TANKS. CASH FOR new or old Propane Storage Tanks from 2500 to 30,000 gallons—200 pound A.S.M.E. Quote price FOB car. Rural Natural Gas Company, Mt. Washington, Cincinnati, Ohio.

WANTED TO BUY: USED PROPANE CYLINDERS and Regulators, all sizes. Box 80, BUTANE-PROPANE News, 1709 W. 8th St., Los Angeles, California.

WANTED TO BUY: 100 LB. PROPANE GAS cylinders, new or used. P. O. Box 166, Westfield, Massachusetts.

## EQUIPMENT FOR SALE

21 BUTANE TANKS—40 GALS., COMPLETE with valves—\$60.00 each. Twohy Lumber Co. 801 Petroleum Bldg., Los Angeles, Calif. PProspect 8746.

## Shell Official Moves Up

F. B. Boice, Shellane sales official for 13 years, has joined the company's New York office as assistant manager of the technical products department, succeeding F. Preu, now manager.

BUTANE-PROPANE News

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for the manufacturers of

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\*\*\*\* STANDARD RADIUS \*\*\*\*

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*Automatic Water Heaters*

Approved by A.G.A. for  
Liquefied Petroleum Gas

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*"Pioneers of the Butane Industry"*

ELECTRIC & CARBURETOR  
ENGINEERING CO.

2323 E. 8th St. Los Angeles

## Are You in a Haze?

Many are when it comes to technical questions and new situations arising in the varied applications of liquefied petroleum gas, equipment and appliances. Maybe we can help you. If confronted by conditions you do not understand or problems that are beyond your experience, ask

## BUTANE-PROPANE *News*

### Research Department

for assistance. Our technical staff will gladly endeavor to answer all legitimate inquiries (except legal and financial) about the LP-Gas industry which regular subscribers choose to submit.

Use this sheet or your own letterhead.

Your Name.....

Your Position.....

Your Company.....

Your Address.....

Your Question.....

Mail to BUTANE-PROPANE News.  
1709 W. 8th, Los Angeles, Calif.

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**LP-GAS CYLINDERS**

***STAR PERFORMERS***  
***BECAUSE OF THEIR***  
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**EASY TO HANDLE**  
**STREAMLINED**

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Formed from a steel sheet of uniform thickness and known strength, the shells of Scaife cylinders are accurately formed to shape by a mild rolling process. Heads are integrally fused into the ends, employing a method that adds a zone of extra strength where rigidity means longer life.

The extra service you get from Scaife *Quality* Cylinders means more today than ever before!

## **SCAIFE COMPANY**

General Offices, Laboratory and Works:  
**OAKMONT (Pittsburgh District), PA.**  
*Representatives in Principal Cities*



**LPG PUMPS**

## AMONG LPG PUMPS

★ Thousands of owners agree that Tokheim is the yardstick of value among LPG Pumps—for these famous units (four models) are designed exclusively for LPG dispensing and have many features never before available. Positive piston displacement type measuring unit and patented differential control assure a solid column of liquid from your tank to customer's tank—and guarantee accurate measurement. High speed delivery and cam type automatic nozzle valve are other special features. For further facts, ask any owner—or write the factory.

### **OUR DEFENSE ASSIGNMENT**

Manufacturing various ammunition components with the unvarying precision required by government specifications.

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FORT WAYNE**

**INDIANA**